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CONTENTS.

Part I. Original Essays.

Page.

RT. I.—Notes on Delirium Tremens, and its treatment by Ipecacuanha. By W. Farquhar, M.D., Garrison Assistant Surgeon, Bangalore........................ 1

RT. II.—A General and Medical Topographical Report of the Madras District. By J. Shortt, M.D., General Superintendent of Vaccination, and late Zillah Surgeon, Chingleput, *(Concluded)*.................................... 21

RT. III.—Lectures on Diseases of the Eye. By George Smith, M.D., Principal of the Madras Medical College, Professor of Ophthalmology, and Superintendent of the Eye Infirmary.............................. 51

RT. IV.—Report on the Febrifuge Properties of the Leaves of Chinchona. By W. N. Chipperfield, Acting Physician, General Hospital.. 85

RT. V.—On the Oxidation of Organic Impurities in Water. By W. R. Cornish, Surgeon; Secretary, Principal Inspector General, Medical Department...................... 90

RT. VI.—Report upon the Epidemic of Bilious Relapsing Fever in Bangalore in 1865. Its Etiology, Nature, Course, Pathology and Treatment, with Observations and Cases. By Thos. Lowe, Esq., Brevet Surgeon, Madras Sappers and Miners................................ 101

Page.

ART. VII.—Analysis of the Historical Register of the 23rd Regiment W. L. I. By W. H. Morgan, Assistant Surgeon 209

ART. VIII.—Report on the Fever which prevailed throughout certain Districts of Western Malwa in 1865. By H. C. Brodrick, Esq., M. D., 1st Regiment Central India Horse 229

ART. IX.—American Notes. Series III. By Henry King, A.B., M.B., Ch.L., Ex-Scholar, Senior and Junior Moderator, Trinity College, Dublin : L.M., Rotunda Hospital, Dublin ; Assistant Surgeon, Madras Army.... 238

ART. X.—Extracts from the Annual Medical Report of European and Native Troops at Secunderabad. By Deputy Inspector-General of Hospitals E. Balfour, Esq. 261

ART. XI.—History of an Epidemic of Dysentery, which occurred at Bangalore, among the 16th Lancers, in June and July, 1866. By C. A. Innes, Esq., M.D., Assistant Surgeon, 16th Lancers 295

ART. XII.—A few Practical Remarks, and Reminiscences, bearing on Asiatic Cholera, and the best Prophylactics, as well as Antagonistic Means to resist the Poison, when it has invaded the system. By Surgeon-Major J. Macbeth, M.D., Surgeon, 16th Queen's Lancers...... 305

ART. XIII.—Thoughts on the Etiology of Cholera. By R. Wilkins, Second Apothecary, Demonstrator of Anatomy, and Curator of the Museum of the Medical College, Madras 321

ART. XIV.—On Cholera in Kurnool. By Surgeon Francis Day, F.L.S. and F.Z.S., Medical Store-keeper, Presidency ; temporarily attached to 28th M. N. I., Kurnool 338

Part II. Reviews & Notices of Books.

1.—Essays and Reports on Operative and Conservative Surgery. By R. G. Butcher, Surgeon and Lecturer on Clinical Surgery to Mercer's Hospital, Dublin, &c., &c. Illustrated by sixty-two lithographic plates, coloured and plain ; and several wood engravings. Dublin : Fannin and Co., London : Robert Hardwicke. 1865, large 8vo., pp. 933 132

Page.

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3.—Surgical Experiences : the substance of Clinical Lectures. By Samuel Solly, F.R.S., Senior Surgeon to Saint Thomas's Hospital : Member of the Council, and late Professor of Anatomy and Surgery in the Royal College of Surgeons of England, etc. London : Robert Hardwicke, 192, Piccadilly. 1865. 8vo. pp. 656....... 150

4.—Hand-book of the Indian Flora ; being a guide to all the flowering plants hitherto described as indigenous to the continent of India. By Lieut.-Col. Heber Drury, Author of "The Useful Plants of India."—2 vols. Tranvancore Sirkar Press, 1864—1866.

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5.—On the Curability of certain forms of Insanity, Epilepsy, Catalepsy, and Hysteria in Females. By Baker Brown, F.R.C.S., Senior Surgeon to the London Surgical Home, &c. &c., London : Robt. Hardwicke, 1866, small 8vo., pp. 85. 369

6.—Report on Vaccination, throughout the Presidency and Provinces of Madras, in the year 1865. Published by Authority. Madras : Printed by Graves, Cookson and Co., 1866. 8vo. pages 67.................................. 376

7.—A Hand-book of the Trees, Shrubs, and Herbaceous Plants growing in the Madras Agri-Horticultural Society's Gardens and Neighbourhood of Madras. Arranged according to the Natural System. By Robt. N. Brown, late Superintendent of the Agri-Horticultural Society's Gardens, Madras. Second edition, carefully revised. With a Supplement by J. J. Wood, Assistant to the Professor of Botany, Medical College. Madras : J. Higginbotham. 1866, 8vo. pages 303..... 379

8.—Report on a Project for the Drainage of the Town of Madras. By Captain Hector Tulloch, Royal Engineers. Madras ; Gantz Brothers, 1865. Crown 8vo. pp. 120. 381

Page.

Part III. Medical Miscellany.

No. 1.—Case of Enormous Aneurism of the Thoracic Aorta, causing absorption of the bodies of several vertebræ, and proving suddenly fatal. By W. Farquhar, M.D., Garrison Assistant Surgeon, Bangalore.......................... 160

No. 2.—A Case of Open Foramen Ovale, but not attended with Cyanosis till two or three days previous to death. By W. Farquhar, M.D., Garrison Assistant Surgeon, Bangalore.. 162

No. 3.—A Case of Hydrophobia. By W. Farquhar, M.D., Garrison Assistant Surgeon, Bangalore................ 165

No. 4.—Ovarian Dropsy, eight years' duration ; Ovariotomy : adhesions separated by the cautery, and pedicle ligatured and left in abdominal cavity ; speedy recovery. By W. H. Harris, M.D., Supt. Govt. Lying-in Hospital....... 169

No. 5.—Four Cases of Stricture of the Urethra, successfully treated on the "immediate" method of Mr. Holt. By Surgeon W. H. Harris, M.D., in Medical charge of the Madras Penitentiary.. 176

No. 6.—Report of the Post-Mortem Examination of the body of a woman brought to the Civil Dispensary, Berhampore, for examination as to the cause of death, April 26th, 1866. By F. L. Clementson, Esq., Surgeon-Major, 11th Regiment N. I................. 181

No. 7.—Report of Deaths in Madras, during the First Quarter of 1866. By W. Arnold Smith, M.D., Officiating Secretary, Sanitary Commission......................... 182

No. 8.—Madras Mortuary Report, for the second Quarter of 1866. By Hon'ble R. S. Ellis, C.B., Sanitary Commissioner.. 188

No. 9.—
- Meteorological Results for April 1866............ 197
- Do. do. for May 198
- Do. do. for June 199
- Do. do. for July 418
- Do. do. for August 419
- Do. do. for September 410

No. 10.—Primary and Secondary Amputation, for dry Gangrene of the leg, the Sequela of Fever ; with Remarks. By John Shortt, M.D., F.L.S., M.R.C.P.L., General Superintendent of Vaccination, Madras....... 393

Page.

No. 11.—A Case of Poisoning by Belladonna, treated exclusively by the administration of Opium. By Surgeon Major J. L. Ranking, Acting Garrison Surgeon, Trichinopoly 401

No. 12.—Cases of Rupture of the Spleen. By A. Porter, Esq., M.D., Zillah Surgeon, Akola 403

No. 13.—Paralysis; Exophthalmos, Amaurosis; Epileptic attacks; Death. Large Scrofulous tumour of the Brain. By Assistant Surgeon W. N. Chipperfield, Acting Physician, General Hospital, Madras 404

No. 14.—Madras Mortuary Report for the Third Quarter of 1866. By W. Arnold Smith, M.D., Officiating Secretary, Sanitary Commission 409

Part IV. Medical Intelligence.

1.—Madras Medical College 200

2.—Professor Bidie's Valedictory Address 200

3.—Sick Furlough Pay of Medical Officers 208

4.—Periodicals received 208

5.—Civil Dispensaries 421

6.—On Feeding Cattle upon the Prickly Pear 425

7.—Order of the Madras Government on the Report on Vaccination for 1865 426

8.—New Rules for the Supply of Surgical Instruments to Medical Officers 427

9.—Organization of the Administrative Medical Staff 429

10.—Books received 434

11.—Periodicals received 434

THE MADRAS

QUARTERLY JOURNAL

OF

MEDICAL SCIENCE.

JULY 1866.

PART I.

ORIGINAL ESSAYS.

ART. I.—*Notes on Delirium Tremens, and its treatment by Ipecacuanha.* By W. FARQUHAR, M.D., Garrison Assistant Surgeon, Bangalore.

BESIDES giving the result of a practical, though limited, experience of the employment of ipecacuanha in this disease since first using it more than two years ago, I have also endeavoured to show that the powers of the remedy in dealing with the disease are strongly confirmed by theoretical considerations based on the known therapeutic actions of the drug. The gradual accumulation of such evidence in the course of reading must form my apology for treating the subject at such length.

Looking, however, even to the possibility of my having over-rated the capabilities of the drug as applied to this disease, I have tried to give the entire subject such a general turn as to prevent my remarks being, in any event, altogether useless. In order to give my views as to some of the ways in which the remedy has proved useful in practice, and adhering also to the idea of treating the matter, at the same

time, from a theoretical stand-point, I will, at the outset, offer some observations and produce some of the more generally received opinions as to

What is Delirium Tremens? Although the distinguishing characters of the fully developed disease are very uniform, it is curious to trace the very different views that various writers and practitioners have, from time to time, taken of its pathology. The descriptions of the *rationale* of the disease, are not only varied, but in many instances opposed to each other, and after ranging them together, it seems almost impossible to detect any thing like a thread of harmony running though the whole. At one time, it was looked upon, and treated as entirely dependent on "Congestion or inflammation of the brain," but it soon became apparent, that this could only be said of it, in some particular cases. Some writers represent the disease as being "akin to inflammation of the brain," while others have viewed it as "the very reverse of inflammation." It is also variously described as "a peculiar excited condition of the nervous system," or a "heightened activity of the sensorium," "anæmia of the brain," "an exhaustion of the nervous system," or as "a brain below *par*." It has also been held to be "a perverted nutrition of the brain," "nervous irritation of the brain," "disorganization of the nervous substance," "a loss of tone of the vessels of the brain." At this date even, the symptoms are by some referred to "subarachnitis," "meningitis," or "phrenitis." Recent observations are supposed to confirm the view, theoretically advanced in 1828 by Leovèille, (vide Aitken's Scien. and Pract. Med.) that delirium tremens "consists in an exalted state of the vital powers of the brain, excited by molecules saturated with alcohol, absorbed from the surface of the stomach and bowels, and carried into the current of the circulation." According to Brown-Sequard* "increased reflex excitability of the nervous centres is one of the most important elements of many neuroses, as delirium tremens, &c."

It would not be very flattering to medicine, either as an art or a science, to suppose that only one of these many views is the correct one, and that all the others are wrong, and the treatment therefore in most cases inappropriate. It is more rational to suppose, nay more, it must be conceded,

* Vide *Lancet* for January 27th, 1866.

that the disease has in reality presented itself in very different forms and aspects, and has therefore yielded to remedies opposite in their action to each other.

Though remarking that the disease presents itself under various phases, it is only conformable to the nature of things to infer that a disease exhibiting a group of symptoms so characteristic and so easily recognized, must in its essence be dependent upon some one abnormal condition, organic or functional, of the nervous system, and that the variety in its appearance is really attributable in most cases to something superadded to the disease, in other words, to some one of its numerous complications.

I repeat, then, that in delirium tremens we have a disease which may be assumed to have some one essential feature, and which may be engrafted on any kind of constitution, sthenic or asthenic, and be attended by many complications, either obscuring, over-riding or adding to the danger of the intrinsic disease.

It falls to the lot of very few, to treat a sufficient number of cases of this protean disease to enable them to take a comprehensive view of it in all its bearings, and it is easy to see that some of the above-mentioned discrepancies have arisen by hasty generalizing from individual experience.

I would here draw attention to the complications which frequently attend the disease, and which have an important influence on its course and duration, and therefore on its treatment. I instance gastritis (by many regarded as the *fons et origo mali*) of various degrees, hepatitis, duodenitis, dysentery, pneumonia, influenza, pleuritis, bronchitis, pulmonary congestion, and the various affections of the brain and its membranes, with which, in my opinion, as already stated, delirium tremens has sometimes been confounded. Dr. Craigie (vide Aitken) remarks that "all the spirit "drinkers whom he has seen or known, have been either "subject to chronic cough or dyspnœa or have laboured "under chronic, dry bronchial disorder, with asthma."

There is one feature of the disease which it is important to notice, viz., that even in sthenic subjects, symptoms of an adynamic form very soon set in, if delirium continue, and the patient be not relieved, by Nature's restorer, sleep. Several things may be said to contribute to this result; the blood poisoning, long abstinence from food, and the great

expenditure of nervous energy caused by the incessant movements and restlessness of the patient.

It is to be regretted that the scalpel has failed to give much more satisfaction than the theoretical notions held regarding this perplexing disease. In some cases where the disease was treated as inflammatory, nothing remarkable was found either in the state of the brain or its coverings; in other cases treated heroically by opium, undoubted evidence of inflammatory action has been observed. In some instances, nothing was discoverable beyond an unusual amount of serous fluid in the ventricles of the brain. There is no possible room for doubting, that in many cases treated by narcotics, the *post-mortem* examination revealed the effects of the treatment and not of the disease; for I read that sometimes after a large dose of opium the patient has become "ungovernably delirious," "raving mad," then "weak and exhausted," and, following another large dose, a train of low symptoms and death! and sometimes without arousing any suspicions that the treatment had something to do with hastening, if not causing, the fatal result. This use, or rather abuse, of opium, has been caused by the belief with some Medical men that the patient "must sleep at all hazards," "must sleep or die." No doubt this is true, but the estimate does not always seem to have been sufficiently careful, as to *when* the patient *must* sleep.

It may not be out of place to here pass in review the chief modes of treatment that have been in vogue for this disease. We find these to include every possible variety from energetic "blood-letting" to the "do-nothing" system of treatment. First in the list comes opium. This agent has been looked upon with the greatest favour, and has held its ground for the greatest length of time, and it is beyond cavil, that no other medicine has as yet achieved so great an amount of success, or, as might be said, hit off so many cases successfully.

In opium, too, we have a fair example of heroic medicine, for in this disease it has been given in doses varying from ½ a grain to 15 grains every two hours* till sleep or death has followed. Beyond what has been already said of the effects of opium, I may add that the long continued use of opium has been known to produce delirium tremens. For further

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* Vide Copland's Med. Dict.

arguments against the use of opium, I refer to an essay by Surgeon-Major Ranking "On the Therapeutics of Delirium Tremens."—Vide *Madras Quarterly Journal*, No. VI.

Opium, combined with Tartar Emetic, as practised and advocated by Dr. Graves, has also been very successful against some forms, and in certain stages of delirium tremens. The treatment by digitalis, which, I observe, was used in doses of one and two drachms some 30 years ago in America, has also been revived and has been credited with success, in some serious forms of the disease. But as in the case of opium no unbiassed judge can deny that it is a hazardous and unsafe remedy.

The more recent treatment by chloroform has been attended by very various results, in the hands of different practitioners, and a larger experience of it is necessary to establish its reputation as a safe agent for general use.

At one time drastic purgatives alone were spoken of as being curative of the disease, and, doubtless, they may have proved very serviceable in those cases which were kept up by hepatic complication. Capsicum has been extolled by some West Indian practitioners, but it is not easy to see how it can be of benefit, except in cases requiring a local gastric stimulant.

I now touch on the latest and, perhaps, the most successful method of managing the disease. I allude to the expectant treatment, aided by measures calculated to support the system, while time is given to eliminate the poison. While believing that, in the majority of cases (where this plan is practicable), nothing better can be done than to adopt it, I am of opinion that in many cases something more is required; I also think it strange that delirium tremens should have been selected as the most favorable of ailments on which to illustrate the *vis medicatrix naturæ.* I cannot conceal my belief that the very unsatisfactory and conflicting results of treatment have tended more than any thing else to this issue, for it requires a larger experience than most practitioners have of the disease, to enable them to resist the urgency there seems to be to do something for the patient.

Besides cases of the pure and simple disease, then, there remain to be dealt with a number of cases having complications, sometimes as formidable as the disease itself; there

also remain those mixed cases where it is doubtful how much of the symptoms is due to delirium tremens or to encephalitis in some degree or form.

Granting, then, that the natural powers, aided by supporting diet, regimen and seclusion, are competent to bring about recovery in a large proportion of cases, the question then arises,—Is there any medicinal agent competent to meet those cases in which the interference of art *is* required to subdue the disease, and that would also be serviceable in most of its complex forms, or at least would not be contra-indicated in almost any of the diseases usually associated with it. I believe that in Ipecacuanha we possess such a remedy.

I am aware that many objections, founded on the more obvious actions of this drug, may be started against its employment here, and it is mainly by presenting on one hand what are supposed to be the features of the disease, and by holding up on the other hand, a picture of the virtues of the drug as drawn by those most familiar with its use, that I hope to prove that ipecacuanha in varying doses will fulfil more of the requirements in the treatment of this disease, than any other known remedy; while, at the same time, it is far less precarious than any in its action.

I may here quote briefly what led to the trial of this remedy, and the impressions I first formed of its powers, and which I recorded in the annual report of the Garrison Hospital, for 1864.

"I avail myself of this opportunity of bringing to notice the very satisfactory effects derived from the exhibition of ipecacuanha in delirium tremens. The use of this remedy was suggested to me by recollecting that in the practice of Dr. Cowpar, Civil Surgeon of Singapore, large doses of this medicine had been found most valuable as a sedative in allaying the fierce excitement occurring in the case of strong European sailors, admitted into the Seaman's Hospital there, and who had been drinking freely of the various vile compounds sold as liquor in that place. It soon appeared that among the broken down, hard-drinking pensioners who chiefly furnish cases of delirium tremens to the Garrison Hospital, Bangalore, no similar cases were likely to present themselves that would furnish a fair trial of this particular action of ipecacuanha. Reasoning, however, from the very beneficial action it exerts as a sedative and calmative, both

to the circulatory and nervous systems, and locally to the mucous membrane, in cases of dysentery, it occurred to me to test its action in delirium tremens, when used as the sole remedy throughout the disease. The result of the limited trial that the Garrison Hospital has afforded has been so favorable as almost to impress me with the idea that its action is directly or indirectly antidotal to the disturbances set up in the system by the excessive use of alcoholic stimulants. This remedy, unlike opium, does not complicate the natural course of the disease, while its beneficial action is too manifest to permit of its being set down as merely of negative value.

"While believing that delirium tremens may be conducted to a safe termination under an eliminative and nutritive or a merely expectant treatment, I should feel disinclined to look idly on, while possessing a remedy, which, as far as has yet been tried, seems to bring about a speedy abatement of the more distressing manifestations of the disease.

"During the employment of this treatment, stimulants of all descriptions have been excluded, and only 2 or 3 pints of chicken mulligatawny, in addition to spoon diet, have been given in 24 hours. It has not been observed that ipecacuanha had any tendency to cause loathing of food ; on the contrary, patients seemed to take their food more readily than is usual in this disease ; this seems explainable on the supposition that the medicine is antagonistic to the extra-vascular and irritable state of the mucous membrane causing the anorexia. Vomiting has been an exceptional occurrence, and only took place when large doses ℈ ii. or ʒ i. were employed. I should expect to find it still more useful in private practice, where a simply expectant treatment cannot so readily be carried out. It would, I believe, go far to remove the intense craving for more stimulants which friends of the patient find it so difficult to control, and by lessening the distressing excitement, would relieve the medical attendant from committing himself to the hazardous and uncertain treatment by opiates."

I now give short abstracts of the cases in which ipecacuanha was of benefit; but as it was given tentatively and experimentally, I refer rather to what is stated in the text for my views as to the mode of use, than to the cases themselves, which, I own, are very imperfect, inasmuch as many details are omitted which would have been originally entered,

had I known the cases would ever be subjected to criticism or challenge.

The cases marked ** and †† represent second admissions of the same two individuals.

CASE No. 1.—A European pensioner, aged 46, admitted 16th March 1864. A confirmed drunkard. Had been drinking ten or twelve days all sorts of liquor and taken little or no food. Could not ascertain when he had last slept.

Was trembling all over, restless and distressed. Tongue very foul; pulse full and soft. Up to morning of 21st had been taking every 4 hours, draughts of Træ. Hyoscyam in effervescing Citrate of Ammonia, but without producing sleep. Ordered to take P. Ipecac. gr. x., Træ. Opii. ♏ x., made into two boluses and given every 4 hours. Next morning he was found sleeping; he had slept since 4 P. M. of the previous day, after taking two doses of Ipecacuan. On 24th March he was discharged. I do not lay much stress on this case, as the medicine was here combined with a little opium, and because the *post hoc* argument might be applied to it, but I mention it chiefly as being the first in which it was tried.

* CASE No. 2.—An East Indian pensioner, Ætat 32, admitted 8 A. M. 21st May 1864, after morning visit. Was incoherent but quiet and without tremors; pulse full and soft; skin natural; tongue clean. Could not ascertain when he had slept. Took P. Ipecac. gr. v. twice before evening when I saw him and prescribed ℈ ii. of Ipecac.

22nd.—Was very restless and troublesome during the night, and at one time quite furious. His talk is now incoherent with busy delirium; fancies snakes, &c., about him; conjunctivæ injected; pulse full and quick; skin covered with perspiration; is very restless. Repeat P. Ipecac. ℈ ii. statim, cold douche to head. *Vespere.*—More quiet, but still talking irrationally; no effect seemed to ensue from the Ipecac.; but that of making him quieter, took 10 grains at noon, give ℈ ii. immediately.

23rd.—Improved. Less excitement, but no sleep. P. Ipecac. ʒ i. statim, cold douche to head. *Vespere.*—An hour after the medicine, he vomited a large quantity of fluid, (not bile) and bowels were opened four times. Immediately after vomiting, he fell into a sleep for an hour and a half, and slept at intervals during the day. After first awaking, he was quite composed and talked rationally.

24th.—Perfectly calm, rational and able to give an account of all that happened to him before admission. Complains of being very hungry. From this date no return of any symptoms, but as he was "feeling weak" he was detained till 30th May, when he was discharged.

† Case No. 3.—A European pensioner, Ætat. 50, admitted 30th May and ordered 10 grains Ipecucuan every 4 hours.

31st.—No sleep; kept walking about all night. Fancies people are going to kill him. Tongue clean; bowels not moved; pulse frequent. Continue Ipecàc.

1st June.—Was troublesome and did not sleep all night. Pulse 128, small in volume. Is in great fear of the sentry killing him. Ordered P. Ipecac. gr. v. every 4 hours.

2nd.—Was very troublesome till midnight, when he slept an hour, and then got up to walk about, but remained very quiet. Is now moving about and talking a great deal. Speaks of his bodily ailments, and says something is the matter with his heart. After a little he sobbed and cried, like a hysterical woman. Cont. P. Ipecac grs. v. Continue diet. To have 6 eggs made into flip for the day. A few minutes after visit, passed a *very black* motion in the ward. *Vespere.*—Slept nearly the whole day. Is now perfectly rational, and says he feels quite well. Took no medicine to-day, Pulse 84, normal in volume.

3rd.—Slept all night.

4th.—Quite well, discharged.

Case No. 4.—A European, D.P.W., Ætat. 43, admitted 31st May, after visit, "dead drunk." *Vespere.*—A strong powerful man, face intensely flushed. Pulse full and frequent; bowels not moved for some days, took on admission P. Ipecac. ℈ i. which acted freely as an emetic. Has taken 10 grains twice since. Is now quite rational and says he has "got a bilious attack."

1st June.—Passed a sleepless night, but gave no trouble. Find him standing at the window, "waiting for his grog." Pulse 126; tongue florid and very raw about the tip. Continue P. Ipecac. gr. x. every 4 hours. *Vespere.*—Has been more excited and not so much under control during the day. At 2 o'clock took P. Ipecac. ℈ ii. which had a quieting effect on him. Complaints of his throat, which is intensely red; and there are white patches on the soft palate. Has slight tremors.

2nd.—Was rather excited in the early part of the night, but was afterwards quiet and slept for an hour or so, about 9 o'clock. Again complaining of his throat; says he can only swallow liquids. Ordered Poppy decoction as a gargle. Continue P. Ipecac. *Vespere.*—Has been sleeping nearly all day, and has, therefore, taken no medicine; pulse 118; skin moist, complaining of throat for which liniment saponis et opii is ordered externally. Has had four copious, dark bilous motions from Infusion Senna ordered in the morning.

3rd.—Slept nearly all night. Had 2 scruples Ipecac. given late. Is perfectly rational and from this date he remained free from all symptoms of delirium tremens. Complains of pain in throat, along œsophagus, and in epigastrium. These symptoms of severe gastritis set in and proved troublesome. He continued in Hospital till 17th June.

† Case No. 5.—Admitted 18th January 1866, 1 P.M. with these symptoms:—violent shaking of the extremities; ferrety eyes; foul tongue, occasional incoherence; loud calling; pulse frequent and small; skin moist. Been drinking hard since Xmas. Had before admission, two glasses of beer, which, with brandy, has been his chief drink. No sleep for three or four nights. Ipecac. was given in 10 grain doses, twice a day from admission. In this case each dose was rejected in an hour after taking.

19th.—No sleep; is not so excited, but is more shaky; tongue very foul. Apply sinapism to epigastrium, before taking Ipecac.

20th.—Very quiet, less trembling; eyes natural; tongue clean; pulse stronger; skin normal. Walked about all night, and fell down several times from unsteadiness. Continue Ipecac. in grain v. doses.

21st.—No sleep. Not improved; delusions returned. Continue Ipecac. in 10 grain doses.

22nd.—Had a good night; is quite sensible and talks coherently. Omit P. Ipecac.

23rd.—Complains of tightness across the chest and dyspnœa. Sinapism.

26th.—Find a large anthrax over right gluteal region, anthrax to be strapped with adhesive plaster. This kept him in Hospital till 6th February.

Case No.6.—A European pensioner, Æt. 50, admitted 2nd

October 1865, after the visit. A healthy-looking, florid complexioned old man, brought to Hospital by the Police, having been made a prisoner for snapping a pistol at a sentry. When seen by me at 1 o'clock, he was moving about rather restlessly, but was quite sensible and coherent. Extreme tremors of the hands; pulse feeble; skin soft and moist; tongue very little coated; conjunctivæ not injected. Did not sleep last night; says he has been drinking brandy freely and long; talks occasionally of seeing snakes, and hearing people whispering. On admission, at 10 A. M., took P. Ipecac. ʒ ss., and shortly before 1 o'clock he had taken another ʒ ss. dose through the Apothecary misapprehending my direction. No vomiting ensued. *Vespere.*—Much quieted. Tremors scarcely perceptible.

3rd.—This morning is greatly better, was quiet all night, but did not sleep much. Bowels moved this morning, but not freely. Continue P. Ipecac. in 5 grain doses.

4th.—Quiet and sensible; no tremors; no delusions; tongue clean; skin natural; slept nearly all night.

5th.—Very well, only troubled in mind about the Police business.

9th.—Discharged.

* CASE No. 7.—Was admitted yesterday evening, 3rd January 1866. Had been drinking since 24th December last. Complains of headache and thirst. Is trembling all over. Tongue dry and coated; skin hot; pulse quick and full; delusions. Has a feeling of sickness at stomach. Took P. Ipecac. ʒ ss. on admission, and had it repeated twice in the night.

5th January.—Had no sleep, but is more steady. Cont. P. Ipecac. in 10 grain doses.

6th.—Improving. Continue P. Ipecac. in 5 grain doses, with a large dose at night. Was ordered a mixture of Liq. Ammonia Acetatis to allay thirst.

8th.—Much better, is anxious to go out.

13th.—Discharged.

CASE No. 8.—A European pensioner, aged 45, came in between 1 and 2 o'clock yesterday under the influence of liquor. Was very shaky, restless and talkative, looked about him suspiciously and fancied himself in a room, where he also imagined he saw somebody who did not exist. On admission

the Apothecary gave ℥ ss., P. Ipecac. and at 10 P. M. P. Doveri grs. x. were also given. Skin now cool; tongue coated with a white fur, but brownish in the middle. Has not slept for some days. Has been leading a vagrant life, and drinking hard, for some days, of country liquor; but has been tippling for a month. P. Ipecac. in 10 grain doses.

26th February.—Better; less tremors; skin cool; tongue clean; bowels have acted this morning. Was quiet and seemed to sleep all night, was a little sick about an hour after first dose of Ipecac.

28th.—Remains steady without any fresh symptoms. Is very restless at night. Continue P. Ipecac. in grain v. doses.

2nd March.—Has been doing well since last report. Omit P. Ipecac.

4th.—Discharged.

The diet, in all these cases, consisted of 2, 3 or 4 pints of chicken pepper-water, in addition to spoon diet, in 24 hours. Once or twice a few eggs made into flip were given.

I here notice a case occurring in the practice of another Medical Officer, and where ipecacuan was tried at the last, but was said to do no good as it was rejected. I give the case for what it is worth. The case (an officer) having, after recovery from delirium tremens, been left in this station, fell to my care, and I came into possession of his history, as reported in his case, which was shortly thus:—

" *2nd November* 1864.—Addicted to drinking. Was seized with an epileptic fit on parade. Up to 3rd November had a succession of fits, with great irritability of stomach and occasional vomiting throughout.

5 P. M. *3rd.*—Was found labouring under "unmistakeable delirium tremens."

6th.—Was visited every two or three hours and was in a critical state. Digitalis in large doses was being given, and the dose taken this day rejected. In consultation with a Senior Medical Officer, digitalis was abandoned, and on the strength of the favorable accounts of ipecacuanha, it was tried in the afternoon; 10 grains were given "in a little fluid only." Report says, "vomited the ipecacuan soon after taking it, and his stomach has been irritable since. Bowels moved, urine has been freely passed, pulse 100. Is inclined to sleep. To continue broth only.

7th.—Better. Obtained sleep from about 8 till 11 P. M., and also afterwards at different intervals during the night. This morning he is quite sensible. No delusions. Pulse 86." No record of any vomiting afterwards.

As the stomach in this case had been irritable all along, and as the ipecacuan was given with a little fluid, which I always avoid, it was not wonderful that it was brought up. But as the efficacy of the medicine does not (as I will try to shew) depend on its (incidental) emetic effect, I conclude that a useful amount had been retained. Whether this be the case or not, the very favorable report next morning shews, at least, that if it did no good, it did not do harm, even in a critical case where it might have been supposed to do so.

I also administered ipecacuan in a good many cases of ebriositas, not from any idea that treatment was necessary, so much as to watch the behaviour of the drug, especially with reference to the tolerance of it or otherwise; and in these cases also there was far less nausea and depression caused, even by its continuous exhibition, than might have been expected. It may be remarked that in the description of these cases, there is, so to speak, a lack of incident as indeed there was in the cases themselves, compared to what I had personally experienced in the treatment of delirium tremens by opium; and with reference to this point I am tempted to quote the words of a very able and observant writer—the late Dr. Geddes, of the Madras Medical Service—when touching on his first experience (vide *Madras Medical Reports* for 1831, p. 143) of ipecacuan, in the treatment of cases of dysentery:—" The cases of dysentery appear to have been " of a mild nature. In comparing the violence of any dis- " ease, however, at different periods or stations, or in differ- " ent hospitals, although it may appear a truism to remark " it, it nevertheless does not seem to have been sufficiently " attended to, that, if one system of treatment is better than " another, let the abilities of the Medical Officer biassed in fa- " vor of the worst system be what they may, the cases treated " under the more beneficial plan may appear generally of a mild " description and be convalescent at an early period: while " all those under another treatment, although perhaps even- " tually saved, become in the course of their progress, violent " diseases, requiring active remedies followed by a lingering " convalescence, and inducing the Medical Officer to attribute " to the particular severity of the complications, symptoms and

" results which might never have occurred under another " mode of treatment."

While remembering what I had incidentally heard of the use of ipecacuan as an initial treatment of cases of ebriositas and delirium tremens, attended with violent excitement, I was not aware whether this was an original idea or not; and to investigate this point and also to see whether I had been anticipated in the systematic and continued use of the remedy in delirium tremens in asthenic cases as well, I turned up all the clinical records at my command, that were likely to throw light on the subject; and I was not long in finding a letter by Dr. Higginbotham (see *Lancet* for April 1855) that ipecacuanha had been already used as a " cure for periodical drunkenness." I also notice in Vol. xxxvii, p. 40, of " Braithwaite's Retrospect," that the same able practitioner gives a large dose of it at the commencement of the treatment of delirium tremens, as an emetic and sedative, exactly in the way that I first heard of its use.

In the letter above referred to, properties are ascribed to this medicine which one would have expected to lead to the use of it in the systematic way I am now advocating. The letter runs thus:—" I would recommend ipecacuanha as a " remedy for drunkenness, taken in half drachm doses as an " emetic. Ipecacuanha has the extraordinary property of " stimulating the whole system, equalizing the circulation, " promoting the various secretions, and, indeed, assisting " each organ of the body, to perform its function, and to " restore it to its natural state.

" Ipecacuanha can be taken with perfect safety as an eme- " tic; on that account it is preferable to tartar emetic. I " believe the administration of half a drachm of the powder " of ipecacuanha as an emetic to be a " cure" for *periodical " drunkenness.*" Whether in such cases the virtue of the remedy really depends solely on its emetic and lowering effect, I do not undertake to say, but in bringing it to notice as an agent in the treatment of delirium tremens, it will be my endeavour to shew that ipecacuan in repeated large or small doses according to the case, has other properties, varying with the dose, which are only too apt to be lost sight of, in the more obvious, I may almost say incidental, action of it as an emetic, which effect is in most cases rather to be guarded against, when it does occur, than solicited.

As with respect to the nature of the disease, so here, I prefer using wherever I can the language of others whose experience and ability carry far more weight than any thing of my own that I might have to offer.

Here, meanwhile, I notice that in a further search after the virtues of ipecacuan, and as if to prove that there is nothing new under the sun ! I find a writer in the *London Medical Repository and Review*, vide Vol. vi. 1828, p. 184, while criticizing the use of sulphuric acid as a cure for intemperance, by Dr. Brinckle of Philadelphia, remarking that after sulphuric acid, " the inclination for the use of " spirits, or even of wine or porter, never recurred. Dr. Brinc- " kle has found that the Tincture of Ipecacuan produces the " same salutary effects."

If now, while proceeding to trace the physiological actions of ipecacuan, we carry in our mind the chief indications for treatment in delirium tremens which are—to tranquillize the patient, to eliminate the poison, to correct vitiated and to restore suspended secretions, to sustain the powers of life, and to procure sleep ; and also keep in view the more frequent complications of the disease as already noticed, I am hopeful that I will have proved the position which I wish to establish, viz., that where medicine is actually required in the treatment of such cases, Ipecacuanha is more likely than any other to perform good service.

I now give the following masterly *resumè* of the actions of the drug taken from Dr. Joseph Ewart's Essay on Tropical Dysentery :—" Ipecacuanha produces all the benefits that " have been ascribed to blood-letting, without robbing the " system of one drop of blood ; it produces all the advantages " of mercury and other purgatives without their irritating " action : it produces all the good results of antimonials and " sudorifices without any of their uncertainty ; and it pro- " duces all the beneficial effects ascribed to opium, without " masking if not aggravating the disease, while the mischief " is silently accumulating within. Thus it may be said that " we possess in ipecacuan a direct and safe antiphlogistic, " a powerful and capital sudorific, an unirritating purgative, " a certain cholagogue, a pancreatic stimulant, and a harmless " sedative to the heart and muscular fibres of the large intes- " tine. I can give no better explanation of the manner in " which this medicine operates, but those who search deeper

"will not fail to perceive that much remains to be elucidat-"ed before the true physiological action of the remedy can "be fully understood."

Again, to shew how it would meet cases where there is hepatic derangement; hindering the elimination of the poison and aggravating and prolonging the disease; in the *Madras Medical Reports for* 1831, Dr. Mortimer thus writes :—"A "strong impression has been left on my mind in favor of "the influence it appears to exert in correcting vitiated "secretions of the liver, and procuring a uniform discharge "of healthy bile."

In the *Army Medical Report for* 1863, the experience of Staff Surgeon H. H. Massey, M.D., is recorded regarding the successful employment of ipecacuan in hepatitis—a treatment which he had adopted from observing how useful the remedy had been in cases of hepatitis, co-existent with dysentery.

For further description of the uses and actions of this remedy by practitioners of a later date, I refer to an able paper in *Madras Quarterly Medical Journal,* No. iii, entitled, "Mr. Cornish's remarks on the treatment of Acute Tropical Dysentery by large doses of Ipecacuanha." I take this opportunity of quoting from the same paper a case by Dr. Mackay, such as many must have seen, shewing that in dysentery (and so I believe in delirium tremens) the otherwise depressing effects of this medicine are expended in curing the disease and restoring to health patients in whom prostration and debility were so great as to appear to contraindicate the remedy.

"CASE No. 1.—Was brought to hospital supposed to be in "a dying state. The patient, a pauper, was weak, emaciated, "almost pulseless from disease, exposure and starvation. "For three days blue pill with acetate of lead and opium were "given, but without any beneficial effect. On the fourth "day, the motions were very frequent, and consisted of no-"thing but blood and mucus; without much expectation of "its doing good, I ordered Tinct. Opii. ♏. xxv., to be followed "in a quarter of an hour by Ipecacuanha gr. xxv.; from "this time he improved; the motions first became less fre-"quent; the ipecacuanha was continued in smaller doses, "and the following day the evacuations were quite free from "mucus and blood."

Again, small doses of ipecacuanha are often very useful in arresting internal hæmorrhage. This power of controlling the circulation of the extreme vessels, would evidently prove very serviceable in the disease now under consideration, for several of the various ideas regarding the state of the cerebral circulation in delirium tremens may be reduced to the simple condition—irregularity—and this inequality of circulation takes place also in the lungs, as, according to Aitken, alcohol "is found unquestionably to retard the "motion of the blood."

In hæmorrhage there is a fine example, as quoted by Waring, of the powers of this drug, "and this procedure (the "giving the remedy in small doses to produce nausea, by "Mr. Trenor) was attended with marked benefit, arresting "the hæmorrhage and restoring heat and life to patients "who were in a state of collapse from loss of blood."

I also indicate a possible way (supposing the premises to be true,) in which ipecacuanha might prove useful in delirium tremens with pulmonic complication, and where the tendency is to death by asphyxia. According to Aitken, "the effects "produced (by alcohol,) on the *medulla oblongata* tend to "sustain this toxic effect (retardation of blood in the capil-"laries) upon the lung." In "Waring's Therapeutics", Dr. Tyler Smith is thus quoted:—after speaking of the emetic effect of ipecacuanha in uterine hæmorrhage and menorrhagia; "but beyond this it appears to have a special action "on the uterus, increasing its contractile power beyond what "could be imagined to occur from the merely secondary "effects of vomiting." He adds "Ipecacuanha then appears "to influence the *medulla oblongata* and the lower *medulla* "*spinalis*. This double action of ipecacuanha upon the "two extremities of the spinal centre, is very extraordinary."

I would now say a word or two anent a prominent objection to the remedy; viz., the probability of its inducing vomiting in cases where it did not previously exist, and aggravating it in those cases where this symptom is already troublesome. Vomiting has, considering the number of doses given, been rather an exceptional occurrence, and has taken place chiefly after the first dose. It will be seen in the case last quoted that vomiting appeared actually to be checked by the drug. In none of the cases was any precaution taken, excepting abstinence from liquids, against the production of emesis, but where necessary, I would employ

measures to prevent as much as possible this effect. Where vomiting depends on irritation of the liver or a congested state of the mucus membrane of the stomach, I believe that, even if the remedy temporarily added to it, relief would very soon follow. But I do not insist on its utility, or the necessity for its use, in this class of cases, which, as Dr. Blacklock (See *Madras Quarterly Medical Journal*, No. xi., p. 114) remarks, are almost always " good cases."

In " Pringle's Army Diseases, 2nd Edit. 1753," I read that " after bleeding, the patient is to be vomited with " *ipecacuanha* ; which removes the sickness at stomach, so " common in the beginning." I have even read of ipecacuanha being recommended in cases of intractable vomiting, when all other means had failed. It might also be objected that ipecacuan would increase perspiration, which is already excessive. But I would remark that it causes an active diaphoresis in substitution of the diaphoresis in delirium tremens which is of a passive nature.

It is worthy of note, that the peculiarities of the action of the remedy, and the tolerance of it that there was in this disease, attracted my attention as much as the good results that followed from its use. I say peculiar action, inasmuch as it had no noticeable or untoward operation in producing vomiting, depression or anorexia, and, different from its action in dysentery, doses of 5 or 10 grains, are not more productive of sickness than large ones.

In setting about treating a patient I seize upon the prominence of excitement or delirium as the measure of the dose to be given. If the patient is very troublesome, and the pulse is not positively failing, I give two scruples of the drug, made into an electuary with honey or fresh mucilage, avoiding for some time the use of any liquid. Should excitement not be abated after four hours, I repeat the dose, and generally this suffices to allay any extraordinary degree of it. The medicine is then continued in 5 or 10 grain doses, till an impression is made on the disease, or till sleep follows, which it *will* do naturally on the removal of the causes producing *insomnia*. When vomiting has occurred, the drug has been continued, as in a case of dysentery, till relief of the more marked symptoms ensue.

Assuming for a moment that I am correct in my supposition that ipecacuanha possesses a marked power over the disease, and given an extreme case where there is pure ner-

vous exhaustion, with delirium unabated, with a rapidly flagging pulse, where, in short, the disease is fast killing the patient, I would then consider whether the vital energies of the patient would be more rapidly spent by the continuance of the disease, or by any possibly depressing effects that the remedy might cause! Or, as in the case of any disease where the vital powers are at a low ebb, it might be necessary to rouse the system before thinking of applying any special treatment.

I look upon ipecacuan in delirium tremens as being the complement—as far as its effects in this disease are concerned—of the combination of tartar emetic and opium, *minus* the depressing effects of the one element, and the *cerebrum*-exciting tendencies of the other, and as being of more universal application. Viewing it thus, it may not be unprofitable to make a few quotations from "Morehead's Researches on Diseases in India," with regard to the tolerance of nauseating remedies, and the kind of cases most frequently met with in tropical climates—"In fact it has seemed to "me that in the second stage of delirium tremens, there is "as complete a tolerance of the emetic action of tartar emetic "combined with opium as obtains in pneumonia, and this I "have remarked even in cases in which there had been irritability of stomach during the first stage."

Again, "the subjects of the toxæmia which induces delirium tremens, are very likely to be exposed to the causes of, "and to be affected with, cerebral determination. It is "because there is some degree of this combination of cerebral determination in by far the larger proportion of cases "of delirium tremens met with in European hospitals in "India, that tartar emetic and cold effusion are so valuable, and the free use of opium and stimulants so dangerous in its treatment."

"In the early stages of the mixed cases, the danger is "from the cerebral capillary derangement; there is seldom "risk from failure of the action of the heart; therefore antimony and cold effusion may be freely used, but opium "very cautiously."

"The circumstances in the pathology of delirium tremens, "which it is of most importance to regard as bearing on the "probable unfavourable result, are the facts of cerebral "determination, of the patient having frequently suffered "from previous attacks of the disease, or of some local

" complication being present—dysentery being that which " will be found to occur most frequently in delirium " tremens in India."

And now, in conclusion, lest I should be thought to lean too much on Art and too little on Nature, I would in a case of delirium tremens, as in any other disease, give full scope to the natural tendency towards recovery, but I would at the same time do what I could to subdue violent symptoms, and to mitigate distress, believing that, in this way, a fair balance would be struck between the *vis medicatrix Naturæ* and the *nimia diligentia Medicinæ*: and also believing that such treatment would, in some instances, save life that would have been forfeited, if committed to the unaided powers of Nature. If further trial of this treatment by others should justify this conclusion, the object with which this paper was written will have been amply fulfilled.

[NOTE.—Since the MS. of this paper left my hands, two excellent Lectures on Delirium Tremens by Dr. Geo. Johnson, have appeared in the *Lancet* for 21st and 28th April of this year. The great stress which is laid on the frequency of fatty degeneration of the heart, might deter many from trying Ipecacuan; but nothing can be urged against it which would not (at Dr. Johnson's own shewing) apply in a greater degree to opium, which he recommends where medicine is indicated, but in the use of which he enjoins extreme caution, as, " where it fails to procure sleep, it may be exercising a powerfully depressing and paralyzing influence on the heart." By the same great authority it is also remarked that " another not uncommon effect of an opiate is to cause nausea and fainting."

With the exception of nausea, the above results could only follow a very reckless administration of Ipecacuan, which possesses the advantage of not requiring so nice (and difficult) a discrimination of cases, as opium. I entirely concur in the very judicious remarks, as to the necessity for feeding the patient well; and it may be necessary to state that I said little about this in my paper, which was in a manner relating the results of experiments which would have been nullified by more than an ordinary exhibition of food.]

ART. II.—*A General and Medical Topographical Report of the Madras District.* By J. SHORTT, M.D., General Superintendent of Vaccination, and late Zillah Surgeon, Chingleput.

(Concluded from Vol. IX., Page 267.)

GENERAL PRODUCTS OF THE DISTRICT.

THERE are no particular *minerals* procurable in this District. *Iron* is met with chiefly on the surface in large lumps or nodules : these chiefly comprise Hæmatitic and Titanic iron ores in the vicinity of the hills both in this place and in other parts of the district. Iron sands are met with in various quantities. The most singular fact connected with the iron sands and ores found in the district, is their magnetic property. Some specimens both attract and repel the magnet, whilst others attract or repel only. They are proved to be rich magnetic oxides, and to contain about 72 per cent. of iron. They are peculiarly interesting from the fact of similar ores and sands from Taranaki in New Zealand having attracted much attention in England, owing to the purity and amount of iron they contain, and being free from sulphur, arsenic, and phosphorus ; they were exhibited during the London Exhibition of 1862. But neither the quantity in which they are met with, nor the expense of fuel in the district, admits of their being worked with advantage.

Lime.—This material is largely manufactured from (cockle) shells of the Cardidæ, along the coast and backwater. It is also met with in a nodular state in various parts of the district : blue nodular lime-stone is met with at Ennore.

Clay.—White ball clay is met with in the vicinity of Conjeveram, and ball clay at the villages of Avady and Coopoor, and fire-clay at Streepermadoor, as also several kinds of potter's clays, brown and black, in various parts of the district.

Granite stone is plentiful, and is worked in several parts of the district, more especially in the village of Mahaballipoorum on the Coast, where many families of stone-cutters or masons reside. Roughly-hewn and coarsely-carved stones

are prepared at Mahaballipoorum into pillars and slabs: some of the former are monoliths, and are from 15 to 20 feet or more in length, and from 2 to 3 feet in diameter; these are readily purchased and conveyed to distant parts of the district for the purpose of building Hindu temples and *muntapums*. The granite which is worked is mostly of a coarse description, but fine kinds are also to be met with in the district.

Salt is largely manufactured in the district along the Coast. The principal places are Chunampett, Cheyoor, Covelong, Ennore, Thummumsharee, and Poothootheevakum, where salt-pans exist. The salt is formed by the sea-water being subjected to solar evaporation, by means of shallow clay beds of various sizes ridged round with earth, and as the water becomes evaporated, the salt held in solution becomes deposited; the water is let in repeatedly till a layer of sufficient thickness is deposited, when it is scraped up and gathered as required by the Collector each year. The Government holds the monopoly of salt in its hands, and pays the manufacturers at the rate of 14 or 15 Rupees per garce. Some of the Zemindars on the Coast contract to manufacture the salt at the above fixed rate. Here it is stored, as it is manufactured, by Government Agents and sold to the public at 180 Rupees per garce, and the surplus stored in the Government *golahs*. from whence it is again retailed to merchants and others by the Government Agents as required.

Vegetable Products.—Firewood and charcoal are exported to Madras from the district, to some extent, and are chiefly the products of the low jungles of the district.

Fruits.—During the season, *mangoes* of a superior quality, some averaging each two pounds in weight, are largely exported. *Jack-fruit*, these average from 30 to 50 pounds each in weight. *Plantains*, several varieties, inclusive of the large red kind, which chiefly comes from the village of Voyaloor on the Coast, in the vicinity of Sadras. *Limes*, *oranges*, *pumplemoses*, *pomegranates*, *citrons*, &c., are all produced in the district to a small extent, and exported to Madras for sale. *Cocoanuts* are produced in every part of the district, but more especially along the Coast, at the extreme southern end of this district. The village of Alumparwa on the Coast, which is about 40 miles from this, produces them largely, and is famed for its cocoanut plantations. The fruits, and the

husks converted into coir, are largely exported, and young plants are also grown here extensively with a view to sale, and for which there is a demand from all parts of the district. The trees fruit well, and I have counted as many as forty nuts on each spadix on several occasions. Two such branches were exhibited at the Local Agricultural Exhibition held here in 1859; one of these was from my own garden.

Vegetables (Kitchen).—Almost every variety of country vegetables known in India is successfully grown in the district for local consumption. These are too numerous to detail. All the European vegetables grow and attain perfection during the first four months of the year.

Grains.—Forty different kinds of rice (paddy), ten of millets, and fourteen of pulses are grown. After local consumption, a small quantity is exported to the Presidency town for sale.

Oil-seeds.—Several kinds of oil-seeds are cultivated as field-culture; others are the produce of trees planted out as topes; to the former belong *gingely* seeds, *earth-nuts, lamp* and *castor oil seeds.*

All of these have their oils extracted to a small extent at Conjeveram, Wallajahbad, and other places. Most of the large villages manufacture it for local consumption. *As topes,* the *Elloopai, Pinnay, Vaypum,* and *Poongun,* are grown, and their oils extracted to a small extent, chiefly for local consumption. These oils are in great demand for the various Hindoo temples, where they are held in great estimation.

Fibres.—The only fibres cultivated for the purpose are the *Sun* or *Crotalaria Juncea* and *Poolachay* or *Hibiscus Cannabinus,* which are fibre-yielding plants. Others abound in the district in a wild, uncultivated state; the variety is large, and the quality of some unexceptionable, and would prove extremely useful, not only for textile fabrics, but for all general purposes. The subject is greatly neglected—the natives being able to supply all their wants in this respect from the plants found growing wild. They are loath to enter into their cultivation as an article of commerce. Should greater attention be drawn to the subject, and a demand for them be created, a large amount of valuable fibre can be grown with advantage to the cultivator and merchant.

Medicinal Herbs.—A variety of medicinal plants are found growing in the district, among which the following may be enumerated; Senna, Indian Sarsaparilla, Chiretta, Stramonium, Colocynth, Indian Squill, Bael, Cassia fistula, Nux Vomica, Hydrocotyle, &c. *Medicinal* and other *gums* are also found in the district to a small extent, which are chiefly expended in local consumption.

Dyes.—Indigo of a superior kind is exported to a considerable extent. The plant is cultivated over most parts of the district, and the natives manufacture the dye largely for export. Some of the European houses of Agency at Madras have manufactories in the district, where Indigo of a superior description is manufactured.

Other dyes, such as the *Chay* root, *Nona*-root-bark, Cashew leaves, Jabrah seeds, Henna, &c., are largely brought into play as such, by weavers, dyers, and others.

Tanning substances.—*Cassia Auriculata* or *Avarum puttay*, Mango bark, Babool bark, Pomegranate rind, *Nelliekoy*, Mundara bark (tree), &c., are found in the district, and used as tanning substances by the natives.

Cotton.—This cultivation has been introduced into the district during the last three years since the origin of the American war, and the culture is being slowly and surely extended.

Sugar.—A small quantity of sugar-cane is grown, but it is chiefly consumed in the raw state, sugar being seldom or ever manufactured from it directly; but the sap of the palmyra, cocoanut, and date trees, is evaporated into *jaggery*; the palmyra supplying the largest amount of jaggery or raw sugar.

In addition to what has been enumerated, a large number of other vegetable substances are grown in the district, chiefly for local consumption, and occasionally for export.

NATURAL HISTORY.

It is impossible to give in these pages a full description of the Fauna and Flora of this district, in which I have resided for the last six years. I had made large collections, some of which I distributed among some of the museums in England, and others to friends: and I find now that I have lost many of my notes, and am therefore unable to give a full catalogue of the collections made in the various departments of natural

history, and just now being pressed for time, I merely give in the following pages a list of animals and plants which I have found and personally recognized in the district.

Geology.—Scattered over this district are various ranges of small mountains with detached hills and rocks of primitive origin, the greatest of which does not exceed five hundred feet in height: and huge masses of granite are met with, over-topping and underlying the surface; these seem to belong to three different periods. Granite in a state of decay and disintegration is met with in most parts of the district a few feet under ground, and a deeper stratum in all its integrity is frequently reached in sinking wells.

The face of the country is a flat level plain, occasionally breaking into a slight undulatory rise in some parts. In others, the soil is made up of red sand frequently giving cover to a bed of gravel occasionally mixed up with laterite: the gravel possesses excellent binding qualities, and is brought into play for road-making. The vicinity of Conjeveram yields some fine sand-stone, occasionally found irregularly variegated with brown, yellow, and lilac colors. In some parts of the district, recent tertiary and alluvial deposits are met with, and, as elsewhere stated, rich magnetic oxides of iron, and materials for pottery and glass are found to exist, as also various other colored earths, and *Kunker* or small nodular lime-stone.

Fossils of wood and shells of various kinds have been found in the vicinity of Streepermadur. I have only seen specimens of the petrified wood.

ZOOLOGY.—DOMESTIC ANIMALS.

1. *Equidæ.* The *Equus Caballus*, or Horse.—Horses are not bred in the district, but the common country ponies are occasionally met with. They are wretched specimens as a body, but occasionally a decent animal is met with. The average price of a common *tat* is from Rs. 10 to 15. Animals of a superior description fetch larger prices.

2. *Asinus.*—The *Asinus Vulgaris*, or *Equus Asinus*, or domestic Ass, is reared to some extent in this district, chiefly by low-caste natives, who use it as a beast of burden; and the wandering classes of natives known as *Dombers*, and *Koravers*, &c. keep them in large numbers. In villages or towns, the washerman is the only individual who patronizes this animal. The ass is greatly despised by the natives, and no

disgrace is considered equal to that of seating an individual on this animal, and drumming him around the town. The milk of the she-ass, however, is considered by the natives as very nourishing to infants and invalids, and is preferred (when obtainable) to that of the cow or goat, for such children as are deprived of their natural sustenance.

3. *Bovidæ. Bos Indicus*, or common Ox.—The cattle of this district are of an inferior and small description, notwithstanding which, they carry out the work of the ryot in his agricultural operations pretty well, and are able to draw heavy cart-loads tolerably well on good roads. The cattle generally belong to the ryots,—there being no regular cattle-breeders; each individual possessing a few, which are huddled together with himself and family in his dwelling at night. No pasturage exists for cattle in the district: during the day they are let loose the first thing in the morning, and driven out to find what they can pick up in the open plains, and return at dusk when they receive a handful of straw; whilst others do not even get this, but subsist only on what they can get in the fields during the day. All the bulls are cut when they get six teeth, and till then they are allowed to run loose among the cows generally. No selection is made with a view to improve the breed; all that they care for, and feel anxious about is, to have a calf at the usual time, and however wretched it may prove, it does not matter to them. The cows, from their diminutive size and the bad feeding they get, are bad milkers; a few do yield from one to two quarts a day, when they receive a feed of some kind of grain, oil-cake or *tour*. The value of a good working bullock is from Rupees 17½ to 25, and that of a cow of the district from Rupees 15 to 20.

Diseases, Epizootic.—Aphtha, murrain, diarrhœa, and, it is generally believed, at times, small-pox, are the chief prevalent diseases. Cattle rapidly fall victims to murrain when it prevails, from being ill-fed and uncared for. And from the diseased animals being allowed generally to mix with the healthy ones, the disease, which is acknowledged to be, and is, infectious, becomes rapidly propagated.

There are no particular remedies in use. Occasionally some unmeaning ceremonies are practised by the natives, and the vine of the country liquorice is tied round the animal's neck. For epizootic aphtha, when the foot becomes sore, the cattle are made to stand in mud and water for

several hours in the day. And for the murrain as well as all other diseases to which cattle are subject, the hot iron is the panacea. With this potential remedy, they frequently torture the unfortunate beast, from the wholesale manner in which it is applied.

4. *Buffaloes. Bubalus Buffelus.*—A large number of these animals are reared in the district, but they are generally of an inferior description and small size. Sometimes good milkers are met with, but those belonging to the district seldom yield two quarts a day when well-fed and taken care of. Sometimes, but not to any extent, they are used as plough and cart-oxen. The value of a working male is from Rupees 10 to 15, and that of a female from Rupees 15 to 20.

5. *Ovis aries*, or the Common Madras *Sheep* is found in the district and propagated to some extent; as they increase in numbers, they are exported for sale to the principal towns. These animals, although they thrive well here, suffer frequently from the N. E. winds during the monsoons, when large numbers are killed from the cold. Occasionally the *sheep-rot* makes its appearance among the flocks, and destroys a large number. For an account of the disease by the writer, vide Proceedings of Government, dated 13th July 1864, Revenue Department. The full grown (1st sort) sheep is to be had at from Rupees 1 to 3 each.

6. *Capreæ* or Goats.—The long-legged and short-legged or hairy goat are reared to some extent in the district, and among these some good milch-goats are met with. Each yields from one to two pints of milk daily when fed with grain. The price of a first sort he-goat is from Rupees 1 to 2, and that of a milch-goat from Rupees 5 to 7.

The flesh of the long-legged variety is the only kind of meat allowed to their patients by the Vythians, in some diseases.

Domestic Poultry.—The *Gallus Domesticus,* or Common fowl; *Meleagris Gallipano,* or Turkey; *Numida Meleagris,* or Guinea-fowl; *Columba domestica,* or Pigeon; *Anas Boschas,* or Duck; *Anas Moschatus,* or Manilla duck; *Anser domesticus,* or Goose, are all propagated and exported largely for sale to the principal towns in the district. As a rule, when the necessary care is bestowed on them, they thrive well, and the natives are very successful in rearing large numbers.

Wild Animals.

Quadrumana.—Of this order, the *Hoonuman* or *Presbytes Entellus* is occasionally met with, and the common *Macaque* or *Macacus Cynomologus* are very numerous about native towns, from being held in veneration by the natives, but they are considered great nuisances in the neighbourhood.

Carnivora. Felidæ.—The *Felis Leopardus* has been shot on two or three occasions, but they are not found located in the district. On the occasions alluded to, they were stray animals, and when such is the case and the natives are able to trace their whereabouts, they take measures for their destruction, and generally with success. I have seen but two that were shot in the district. The *Felis Catus*, or Jungle Cat is also met with: and the Hyena or *Hyæna Vulgaris* or *H. Striata* is common.

Canidæ.—Of this order, independent of the Village Dog or the *Canis familiaris*, the *Canis Vulpes* or Fox, and the *Canis Aureus*, or Jackal, are plentiful, more especially the last-named animal, which proves a great nuisance in the district.

Cheiroptera.—Of this order, the Flying-fox or *Pteropus Edulis* and the *Pteropus Leschenaultii*, which is a small frugivorous Bat, and two kinds of the long-eared Bats, the *Plecotus Auritus*, and a species of the *Megaderma Lyra* are plentiful.

Viverridæ.—Of this family, the *Herpestes Griseus* or Mongoose, and *Paradoxurus typus* (Viverra nigra) or Wood-dog, and the *Viverra Civetta*, are plentiful.

Ornithology.

1. Ord. *Raptores.*—Of this order, the *Otogyps Calvus*, or Black Vulture; *Cathartes Aura*, or Turkey Buzzard, or American or Carrion Vulture; the *Cathartes Papa*, or King of the Vultures; *Falco Peregrinus*, or "*Bhyri*;" *Falc Peregrinator*, or "*Shalim*;" *Accipiter Besra*, or "*Besra*;" *Hypotriorchis Chicquera*, or "*Tirumti*;" *Aquila Pennata*, or Dwarf Eagle; *Nisæctus Bonelli*, or "*Rajali*;" *Haliaster Indus*, or Brahminy Kite; *Milors Govinda*, or Pariah Kite; *Strix Candidus*, or Grass Owl; *Urra Bengalensis*, or Horned Owl—are found in various parts of the District.

2. Ord. *Insessores.*—*Hirundo Rustica*, or Common Swallow; *Cotyle Concolor*, a species of Martin; *Cypsælas Botassiensis*, or *Palm Swift*; *Caprimulgus Asiaticus*, or Goat-

sucker; *Merops Viridis,* or Indian Bee-eater; *Coracias Indica,* or Common Jay; *Halcyon Leucocephalus,* or large King-fisher; *Alcedo Bengaliensis,* or small King-fisher; *Ceryle Rudis,* or large Black and White King-fisher; *Meniceros Bicornis,* or Grey Hornbill; *Palsorius Torquatis,* or Rose-ringed Parrakeet; *Chrysocolaptes Sultaneus,* or Royal Indian Woodpecker; *Endynamys Orientalis,* or Indian Cöil (pron. Queel); *Centropus Ruffiennis,* or Crow Pheasant, or Indian Concal; *Leptocoma Zeylanica,* or Honey sucker; *Arachnechthra lotenia,* or Purple Honeysucker; *Decæum Concolor,* or Flower Pecker; *Upupa Nigripennis,* or Hoopoe; *Lanius Loptora,* or Indian Grey Shrike; *Dicrurus Macrocercus,* or King Crow; *Tchitrea Paradisea,* or Indian Fly-catcher; *Dumetia Albogularis,* or White-throated Wren-babbler; *Pellorneum Ruficeps,* or Spotted Wren-babbler; *Malacocircus Griseus,* or White-headed Babbler; *Malacocircus Malabaricus,* or Jungle-babbler; *Ixos Luteolus,* or White-browed bush Bulbul; *Oetocompra Jocosa,* or Red-whiskered Bulbul; *Pycnonotus Hæmorhous,* or Common Bulbul; *Oriolus Kundoo,* or Mangoe Bird; *Thamnobia Fulicata,* or Indian Black Robin; *Sylvia Orphæa,* or large Black-capped Warbler; *Motacilla Madraspatana,* or Pied Wagtail; *Colobates Sulphurea,* or Grey and Yellow Wagtail; *Corvus Culminatus,* or Indian Corby; *Corvus Splendens,* or Common Crow; *Acridotheres Tristis,* or Common Myna; *Temenuchus Pagodarum,* or Brahminy, or black-headed Myna; *Pastor Roseus,* or Rose-colored Starling (cholum bird); *Ploceus Baya,* or Common Weaver-bird; *Estrella Amandava,* or Red Wax-bill; *Passer Indicus,* or House-sparrow; *Mirafra Affinis,* or Madras Bush Lark; *Spizalanda Deva,* or Small-crested Lark (chendul); *Alanda Gulgula,* or Indian Sky-lark (monaludi); *Galerida Cristata,* or Large-crested Lark (chendul).

3. Ord. *Gemitores.*—*Crocopus Cheerigaster,* or Green Pigeon of Southern India; *Columba Intermedia,* or Blue Rock Pigeon, (or C. livia); *Turtur Cambayensis,* or Little Brown Dove; *Turtur Suratensis,* or Spotted Dove; *Turtur Risoria,* or Common Ring Dove; *Turtur Humilis,* or Red Turtle Dove.

4. Ord. *Rasores.*—*Pterocles Fasciatus* or Painted Sand Grouse; *Pavocristatus,* or Pea-fowl; *Gallus Sonneratii,* or Grey Jungle-fowl; *Galloperdix Lunulosus,* or Painted Spur-fowl; *Ortygornis Ponticeriana,* or Grey Partridge; *Perdicula Cambayensis,* or Girza Quail; *Perdicula Asiatica,* or Lowa

Quail; *Coturnix Communis*, or large Grey Quail; *Coturnix Coromandelica*, or Common Batair Quail; *Turnix Taigoor*, or Gooldo, or black-breasted Bustard Quail.

5. Ord. *Grallatores.*—*Sypheotides Auritis*, or Lesser Floriken; *Cursorius Coromandelicus*, or Indian Courier Plover; *Squatarola Helvetica*, or Grey Plover; *Egialitis Pyrrhothorax*, or Lesser Sand Plover; *Sobivanellus Goensis*, or Red-wattled Lapwing; *Sarciophorus Bilobus*, or Yellow-wattled Lapwing; *Strepsilas Interpres*, or Turnstone; *Gallinago Scolopacinus*, or Common Snipe; *Gallinago Gallinula*, or Jack Snipe; *Rynchœa Bengalensis*, or Painted Snipe; *Actitis Glareola*, or Spotted Sandpiper; *Ciconia Alba*, or White Stork; *Ardea Cinerea*, or Grey Heron; *Ardea Purpurea*, or Purple Heron; *Herodias Alba*, or Large Egret; *Herodias Garzetta*, or Little Egret; *Ardeola Leucoptera*, or Pond Heron (Paddy-bird); *Nycticorax Griseus*, or Night Heron (wakka); *Anastomus Oscitans*, or Shell Ibis; *Theeskiornis Melanocephalus*, or White Ibis.

6. Ord. *Natatores.*—*Phœnecopterus Roseus*, or Flamingo; *NettapusCoromandelianus*, or White-bodied Goose-teal; *Dendrocygna Major*, or Whistling-teal; *Dafila Acuta*, or Pintail Duck; *Mareca Penelope*, or Widgeon; *Querquedula Crecca*, or Common Teal; *Querguedula Circia*, or Blue-winged Teal; *Graculus Carlo*, or Large Cormorant; *Graculus Sinensis*, or Lesser Cormorant; *Graculus Javanicus*, or Little Cormorant; *Plotus Melanogaster*, or Indian Snake-bird.

REPTILIA.

1. *Crocodilus Frontalus* (vulgaris) is found in the tanks.

2. *Chelonia.*—The *Testuda Radiata*, or small Land Turtle; *Tetraonyx Lessoni*, or Fresh-water Turtle, is found in the fresh-water tanks, brooks, and rivers.

3. *Ophidia.*—Of this order, the *Duboia Elegans*, or Russell's Viper; *Echis Carinata*, or Surata Pamboo of the Natives; *Python Molurus*, or Rock Snake; *Tropidonatus stolatus*, or Calliancooty (Tamil); *Passerita Mycterizansœ*, or Green Snake; *Bungarus cadidus*, or Yenna Vyrien (Tam.); *Naja Tripudians*, or Cobra; *Sycodon Aulicus*, or Carpet Snake; *Coluber Blumenbachii*, or Whip-Snake; *Dipsas Trigoriata*, or Peria Sudratay (Tam.), with several kinds of water-snakes, are met with.

4. *Batrachia.*—*Rana Tigrina*, or Bull-frog; *Rana culti-*

poru, or Green-frog; *Polypedates Leucomystax*, or Chunam-frog; and the *Bufo Scaber*, or Common Toad, are seen.

Geckos. Lacerta Gecko, or House-lizard; *Hemidactylus Coctei*, or Common House-lizard; *Enprepus Rufescens*, or Sound Lizard; *Colotes Versicolor*, or Blood-sucker; *Chamæleo Africanus*, or Chameleon, are plentiful.

PISCES.—1. FRESH-WATER.

Anabas Scandens,	or Panni Eyri	(Tamil.)
Ophicephalus Punctatus,	or Korave	do.
Ophicephalus Marginatus,	or Para Korave	do.
Ophicephalus Striatus,	or Varalu	do.
Rhyncobdella Aculeata,	or Aral	do.
Mastocemblus Marmoratus,	or Kul Aral	do.
Cyprinus Fimbriatus,	or Kainda	do.
Cyprinus Cirrhosis,	or Vailleechee	do.
Silurus Bimaculatus,	or Vallay	do.
Silurus Niger,	or Thaillee	do.
Eliotris Niger,	or Unnay Meen	do.
Gobius Setosus,	or Ooloove	do.
Bagrus Bilineatus,	or Tope Kelti	do.

2. SEA-FISH.

Lotes Nobilis,	or Kuduva	(Tamil.)
Ambassis Commersonii,	or Selintan	do.
Serranus Lanceolatus,	or Panni Min	do.
Mesoprion Annularis,	or Kuttu Purri	do.
Therapon Therops,	or Kuttu Kichan	do.
Sillago Acuta,	or Kelingan	do.
Otolithus Versicolor,	or Panna	do.
Pristipoma Caripa,	or Koori Min	do.
Scauber Karagurta,	or Kana Keleti	do.
Cybium Guttatum,	or Vanjara	do.
Cybium Interruptum,	or Velerhe	do.
Lactarius Delicatulus,	or Socdoombu	do.
Stromateus Candidus,	or Velle Vaval	do.
Stromateus Niger,	or Karoopoo Vaval	do.
Trichurus Naumela,	or Walé	do.
Trichurus Savola,	or Savale	do.
Mugil Cephlotus,	or Kola Kende	do.
Engraulis Albus,	or Netteli	do.
Synaptura Commersonii,	or Erumeināk	do.
Scyllium Maculatum,	or Soira Min	do.

INSECTA.

Ord. *Rynchota.*—The Homoptera, Membracina, and Heteroptera, of this order, are met with.

Ord. *Orthoptera.*—Members of this order are well represented in the various kinds of Grass-hoppers and Locusts.

Ord. *Neuroptera.*—Of this order, the *Termes fatalis* or White ant, is plentiful, and frequently proves a nuisance.

Ord. *Diptera.*—Of this order, the Muscidæ or Fly-family are well represented, and the mosquitoes often prove a great nuisance.

Ord. *Lepidoptera.*—This order is well represented, more especially by the Tineina, Totricina, Geometrina, Nocturna, and Catocolæ.

Ord. *Hymenoptera.*—Of this order, the Phyllophaga, or Saw flies, and the Xylophaga or Tailed Wasps, are representatives.

Ord. *Coleoptera.*—Of this order, the Tetramera, Pentamera, Hydradiphagæ, and others, are met with.

Insect life abounds in this district, and it would take more time than I can at present afford to give these in detail.

ANNELIDA.—The Leech is found in abundance in the tanks and shallow pools in this district, and any quantity can be readily got. I have submitted specimens of the Leech found in the district, to F. Moore, Esq., of the East Indian Museum.

CRUSTACEA.—Of this order, the Brachyuræ are met with: along the coast Sea Crabs are met with, and in the interior land and fresh-water Crabs abound in the paddy-fields.

MOLLUSCA.—The Ampullaria, Limnea, Helix Mylittis, Planorbis, Unio, and a great number of other mollusks are met with. The *Ostrea Edulis*, or edible Oyster is procurable in large numbers from the backwater at Covelong.

BOTANY.

Flora of the Madras District.

CLASS I.—DICOTYLEDONES.

Ranunculaceæ.......Naravella Zeylanica ; common.
Dilleniaceæ..........Delinia Hebecarpa.
Anonaceæ.............Anona Squamosa ; wild and cultivated.

Anona Reticulata ; cultivated.
„ Muricata ; do.
Artabotrys odoratissimus ; cultivated.
Gnatteria longifolia.
Nymphæaceæ........Nymphæa rubra.
„ alba.
„ edulis.
„ lotus.
„ odorata.
„ rosacea.
Menispermaceæ.....Cocculus cordifolius.
„ Indicus.
Papaveràceæ........Argimone Mexicana
Cruciferæ...........Lepidium sativum ; cultivated.
Sinapis ramosa ; do.
Capparidaceæ.......Gynandropsis pentaphylla.
Cleome monophylla.
Polanisia icosandra.
Cratæva Roxburghii.
Capparis horrida.
„ brevispina.
„ divaricata.
„ grandis.
Cadaba Indica.
Flacourtiaceæ........Bixa Orellana; a few trees only met with.
Violaceæ..............Ionidium suffruticosum.
Malvaceæ............Malva Mauritiana.
Hibiscus Surattensis. }
„ vesicarius. }
„ rosa Sinensis. } Cultivated.
„ Cannabinus. }
„ Sabdariffa. }
Abelmoschus esculentis. }
Thespesia populnea.
Gossypium herbaceum. }
„ religiosum. } Cultivated.
„ Barbadense. }
„ acuminatum. }
Abutilon tomentosum.
„ Indicum.
Sida acuta.
„ retusa.
„ rhomboidea.

Sterculiaceæ..........Adansonia digitata; rare.
Bombax Malabaricum.
Eriodendron aufructicosum.
Sterculia fætida.
Ixora Coccinea; in gardens only.
Byttnereæ............Guazoma tomentosa.
Terustramiaceæ....Cochlospermum Gossypium.
Aurantiaceæ........Atalantia monophylla.
Bergera Kœnigii.
Feronia elephantum.
Œgle marmelos.
Citrus decumana; in gardens only.
„ aurantium; do.
„ bergamia; do.
„ limonum; do.
„ medica; do.
Limonia acidissima; do.
Guttiferæ..............Calophyllum Inophyllum.
Sapindaceæ.........Cardiospermum helicacabrum.
Sapindus emarginatus.
Meliaceæ.............Melia azedarach.
Azadirachta Indica.
Vitaceæ..............Vitis quadrangularis.
„ vinifera; in gardens only.
Oxalidaceæ...........Averrhoa Carrambola. } In gardens only.
„ bilimbi. }
Oxalis corniculata; cultivated.
Zygophyllaceæ......Tribulus languinosus.
Rutaceæ..............Ruta graneoleus; cultivated.
Rhamnaceæ.........Zizyphus jujuba.
„ scandens.
Anacardiaceæ......Anacardium occidentale.
Semicarpus anacardium.
Mangifera Indica.
Odina wodier.
Spondias mangifera.
Leguminosæ........Crotolaria juncea; cultivated.
„ verrucosa.
„ trifoliastrum.
„ quinquefolia.
Rothia trifoliata.
Trigonella fænum græcum; cultivated.
Cyamopsis psoraloides; do.
Indigofera tinctoria; do.

Indigofera aspalathoides; cultivated.
„ enneaphylla.
„ trita.
Clitoria ternata.
„ albiflora.
Agati grandiflorum.
„ albiflorum.
„ coccineum. } In gardens only.
Aschynomene aspera.
„ Indica.
Zornia augustifolia.
Vicia faba; cultivated.
Guilandina bonduc.
Sesbania Ægyptiaca.
Pisum sativum; cultivated.
Abrus precatorius.
Phaseolus vulgaris; cultivated.
„ mungo; do.
„ trilobus; do.
Dolichos uniflorus; do.
Lablab vulgare; do.
Mucuna pruritus.
„ monosperma.
Cajanus Indicus; cultivated.
Erythina Indica.
Cannabalia gladiata.
„ virosa.
Butea frondosa.
Pongamia glabra.
Arachis hypogea; cultivated.
Poinciana pulcherrima.
„ concolor.
„ elata.
„ regia.
Parkinsonia aculeata.
Tamarindus Indicus.
Cathartocarpus fistula.
„ Roxburghii; in gardens only.
Cassia alata.
„ glauca.
„ auriculata.
„ tora.
Bauhinia purpurea.

Pterocarpus marsupium.
Bauhinia candida.
„ tomentosa.
Mimosa Indica.
Inga dulcis.
Adenanthera pavonia.
Acacia Arabica.
„ leucophlea.
„ rugata.
Wrightia tinctoria.
„ antidysenteria.
Prosopis Spicigera.
Acacia sundra.
„ speciosa.
„ sirissa.
Moringaceæ.........Moringa pterygosperma.
Rosaceæ..............Rosa Indica; in gardens only.
„ Edwardsii; do.
Lythraceæ............Lawsonia alba.
Lagerstræmia Indica.
„ Reginæ.
Combretaceæ........Terminalia Catappa.
„ belerica.
„ tomentosa.
Quisqualis Indica.
Myrtaceæ............Punica granatum; in gardens only.
Psidium pomiferum.
„ pyriferum.
Myrtus communis; in gardens only.
Syzgium Jambolanum.
Jambosa vulgaris; in gardens only.
Barringtoniaceæ...Barringtonia speciosa.
Cucurbitaceæ........Langenaria Vulgaris; cultivated.
Cucumis Melo; do.
„ Sativas; do.
„ Colocynthis
Bryonia Scrabrella.
„ Rostrata.
„ Callosa.
„ Epigæa.
Coccinia Indica.
Momordica Charantia
„ Muricata; cultivated.
Trichosanthes Anguina; do.

	Trichosanthes Cucumerina; cultivated.
	Cucurbita Maxima; do.
	„ Citrullus
Papayaceæ...........	Carica Papaya.
Portulaceæ...........	Portulaca Oleracea; cultivated.
	„ Quadrifida..
	Trianthema Obcordata.
Crassulaceæ........	Bryophyllum Calycinum.
Cactaceæ.............	Opuntia Dillenii.
	„ Vulgaris.
	„ Cochinellifera.
Umbelliferæ........	Coriandrum Sativum; cultivated.
	Hydrocotyle Asiatica.
Cinchonaceæ........	Nanclea Parvifolia.
	„ Cadamba
	Stylocoryne Webera.
	Morinda Citrifolia.
	„ Tinctoria.
	Gnettarda Speciosa.
	Ixora Coccinea.
	„ Parviflora.
	Pavetta Indica.
	Hydrophylax Maritima.
	Hamelia Putens. In gardens only.
Compositæ...........	Grangea Madraspatana.
	Helianthus Annuus.
	Tagetes Patula.
	„ Erecta.
	Chrysanthemum Indicum.
	Artemisia Indica.
	Senecio Vulgaris.
	Eclipta Prostrata.
Sapotaceæ.............	Mimusops Eleugi.
	Bassia Longifolia.
	„ Latifolia.
Jasminaceæ..........	Jasminum Sambac. In gardens only.
	„ Angustifolium; do.
	„ Grandiflorum; do.
	Nyctanthes Arbor Tristis; do.
Asclepiadaceæ.......	Cryptostegia Grandiflora.
	Calatropis Gigantea.
	„ Hamiltonii.
	Hemedismus Indicus.
	Demia Extensa.

	Pergularia Odoratissima.	
	Allamanda Cathartica.	
	Carissa Carandas.	
	Thevetia Nerifolia.	In gardens only.
	Taberuœmontana Coronaria;	do.
	Vinca Rosea;	do.
	„ Albiflora;	do.
	Plumeria Acuminata;	do.
	„ Alba;	do.
	Nerium Odorum	
	„ Albo-simplex.	
	„ Plenum.	
Loganiaceæ	Strychnos Nux Vomica.	
	„ Potatorum.	
Gentianaceæ	Villarsia Cristata.	
Bignoniaceæ	Bignonia Suberosa.	
	Calosanthes Indica.	
	Tecoma Staus. In gardens only.	
Pedaliaceæ	Pedalium Murex.	
	Sesamum Indicum; cultivated.	
	„ Prostratum.	
	Martynia Diandra.	
Convolvolaceæ	Evolvulus Alsinoides.	
	Hewittia Bicolor.	
	Ipomœa Reptaus.	
	Pes Capræ.	
	Ipomœa Gemella.	
	„ Turpethum.	
	„ Pes-tigridis.	
	Batatus edulis; cultivated.	
	Pharbitis nil.	
	Argyreia speciosa.	
Cuscutaceæ	Cuscuta reflexa.	
Cordiaceæ	Cordia myxa.	
	„ augustifolia.	
Boraginaceæ	Trichodesma Indica.	
Ehretiaceæ	Ehretia aspera.	
	„ buxifolia.	
	Tiardium Indicum.	
Solanaceæ	Physalis Peruviana.	
	„ flexuosa.	
	Capsicum annuum; cultivated.	
	„ frutescens;	do.
	„ fastigiatum.	

	Solanum Melongena; cultivated.
	„ incertum; not do.
	„ torvum; do. do.
	„ trilobatum; do. do.
	„ Jacquini; do. do.
	Lycopersicon esculentum.
Atropaceæ...........	Nicotiana tabacum; cultivated.
	Datura alba.
	„ fatuosa.
Scrophulariaceæ....	Semnophila gratioloides.
	Torena Asiatica.
	Vandellia Roxburghii.
Labiatæ..............	Œcimum canum.
	„ basilicum.
	„ thyrsiflorum.
	„ sanctum.
	Salvia officinalis; cultivated.
	Anisomeles ovata.
	„ Malabarica.
	Lencos aspera.
	„ Cephalites.
Verbenaceæ.........	Zapania nodiflora.
	Lantana Indica.
	Duranta Ellisia; in gardens.
	Tectona grandis; a few trees only.
	Premna integrifolia.
	„ latifolia
	Gmelina arborea.
	„ Asiatica.
	Vitex trifolia.
	„ negundo.
Acanthaceæ..........	Asystasia Coromandelina.
	Barleria prionitis.
	Graptophyllum hortense; in gardens only
	Adhatoda vasica.
	Gendarussa vulgaris.
	„ Tranquebarensis.
	Rhinacanthus communis.
	Andrographis paniculata.
	Asteracantha longifolia.
Plumbaginaceæ....	Plumbago Zeylanica.
	„ rosea.
Nyctaginaceæ.......	Boerhaavia procumbens.
	„ repanda.

Mirabilis Jalapa.
Pisonia morindifolia; in gardens only.
Amaranthaceæ......Celosia argentea.
„ cristata.
Amaranthus polygamus; cultivated.
„ ruber; do.
„ oleraceus; do.
„ olus; do.
„ spinosus.
„ tristis.
„ campestris.
Erna lanata.
„ sessile.
Achyranthus aspera.
Gomphrena globosa (ruber.)
„ „ (alba.)
Alternanthera sessilis.
Chenopodiaceæ......Spinacia oleracea; cultivated.
Bassella alba.
Phytolaccaceæ......Giesekia pharnacioides.
Polygonaceæ.........Rumex vesicarius; cultivated.
Aristolochiaceæ....Aristolochia bracteata.
„ Indica.
Euphorbiaceæ......Euphorbia nivulia.
„ pilulifera.
„ antiquorum.
„ tortilis.
„ tirucalli.
Acalypha Indica.
„ betulina.
Jatropha multifida; in gardens only.
„ curcas.
„ glandulifera.
Janipha manihot; in gardens only.
Ricinus communis; cultivated.
„ (fructus majoribus); do.
Phyllanthus Madraspatensis.
„ Niruri.
Emblica officinalis.
Cicca disticha; in gardens only.
Urticaceæ..........Cannabis Sativa; cultivated.
Arotcarpaceæ......Artocarpus integrifolia; in gardens only.
Morus Indicus.

Ficus Carica; in gardens only.
„ Indica.
„ religiosa.
„ nitida.
„ racemosa.
„ oppositifolia.
„ Tsiela.
„ Benjamina.
Itilaginaceæ.........Antidesma paniculata.
Piperaceæ..........Chavica betel; cultivated.
Casuarinaceæ.......Casuarina muricata; do.
Cycadeaceæ.........Cycas circinalis.

CLASS II.—MONOCOTYLEDONES.

Endogenæ.

Dioscoreaceæ........Dioscorea alata; cultivated chiefly.
„ purpurea; do.
„ oppositifolia; do.
Roxburghiaceæ......Roxburghia glorosoides.
Hydrocharidaceæ...Vallisneria spiralis.
„ alternifolia.
Zingiberaceæ........Zingiber officinalis; cultivated chiefly.
Curcuma longa; do.
Hedychium coronarium.
Marantaceæ.........Maranta arundinacea; cultivated.
Canna Indica.
„ lutea.
Musaceæ.............Musa paradisiaca; cultivated.
„ rubra; do.
Amaryllidaceæ.....Crinum Asiaticum.
„ difixum.
Agane Americana.
„ vivipara.
Fourcroya gigantea.
Bromeliaceæ........Ananas sativus.
Liliaceæ.............Gloriosa superba.
Sanseveira zelanica.
Alve Indica.
Yucca gloriosa; in gardens only.
Allium Cepa; cultivated.
„ sativum; do.
„ sarmentosus; do.
Palmaceæ............Areca Catechu; in gardens only.
Calamus rotang.

	Borassus flabelliformis.	
	Phœnix farinifera.	
	„ sylvestris.	
	Cocos nucifera ; cultivated.	
Pandanaceæ........	Pandamus odoratissimus.	
Typhaceæ............	Typha elephantina.	
	,, angustifolia.	
Oraceæ..............	Amorphophallus campanulatus.	
	Colocasia antiquorum.	
	Dracontium polyphyllum.	
Pistiaceæ............	Lemua globosa.	
	Pistia stratiotis.	
Graminaceæ......	Oryza Sativa ;	cultivated.
	Zea Mays ;	do.
	Panicum miliaceum ;	do.
	„ miliare ;	do.
	„ pimentosa;	do.
	„ Italicum ;	do.
	,, frumentaceum ;	do.
	Pencillaria spicata;	do.
	Spinex Squarrosus ;	do.
	Cynodon dactylon ;	do.
	Elensine Coracana ; not	do.
	,, stricta ; „	do.
	,, Ægyptica ; ,,	do.
	Poa annua ; „	do.
	Testuca Indica.	
	Bambusa arundinacea.	
	Saccharum spontaneum ;	cultivated.
	„ officinarum ;	do.
	Shorgum vulgare ;	do.
	„ saccharatum ;	do.
	Andropogon muricatus.	
	„ citratus.	

CLASS III.—ACOTYLEDONES.

Thallogenæ.

Filices...............	Hemonitis cordata.
	Polypodium quercifolium.
	Zygodium microphyllum.
Lycopodiaceæ.......	Lycopodium cernum.

The above does not include the *entire* flora of the District.

Statement shewing the period the several descriptions of grains, &c., are sown and cropped in the District of Chingleput.

Description of Land.	Description of Grain.	Total period of the process of Sowing.	Total period of process of Cropping.	No. of months crop remains in the Ground.	Period of Sowing.	Period of Cropping.
	Sumbah or White Rice.	Months.	Months.			
Nunjah.	1. Codum Sumbah	1	1	6	12th March to 30th April...	15th August to 14th Sept.
	2. Seeraga Sumbah	1	1	7	13th June to 12th July......	14th Dec. to 12th January.
	3. Peroom Sumbah.........	1½	1	7	15th July to 29th August..	13th Jan. to 11th February
	4. Vadam Sumbah	1	1	6	15th July to 13th August..	14th Dec. to 12th January.
	5. Neeravully Sumbah.....	1½	1	8	15th July to 29th July......	11th Feb. to 11th March.
	6. Chinna Sumbah.........	1	1	7	15th July to 13th August...	13th Jan. to 11th February
	7. Cadoicullatham..........	1	1	8	do. do.	11th Feb. to 11th March.
	8. Sagappoo Mologoo......	1	1	7	do. do.	13th Jan. to 11th February.
	9. Thoayamully.. ...	1	1	8	do. do.	11th Feb. to 11th March
	10. Sooramany Sumbah....	1½	1	7	15th July to 29th August..	13th Jan. to 11th February.
	11. Kuckyla Sumbah.......	1	1	7	15th July to 13th August..	do. do.
	12. Polun Sumbah...........	1½	1	7	15th July to 29th August..	do. do.
	13. Soogados....	1	1	5	15th August to 13th Sept..	14th Dec. to 12th January.
	14. Vellaymolagoo Sumbah	1	1	4	15th Sept. to 14th October.	do do.
	15. Puttaray Sumbah.......	1	1	7	15th July to 13th August..	13th Jan. to 11th February.
	16. Manavaray Sumbah.....	1	1	5	14th Dec. to 12th January.	12th April to 11th May.

Statement shewing the period the several descriptions of grains, &c., are sown and cropped in the District of Chingleput.

Description of Land.	Description of Fruits.	Total period of the process of Sowing.	Total period of process of Cropping.	No. of months crop remains in the Ground.	Period of Sowing.	Period of Cropping.
Poonjah or Dry Ground.	*Dry Grains.*	Months.	Months.			
	1. Munja Calvargoo	1	1	4	13th May to 11th June......	15th Aug. to 13th Sept.
	2. Carimchooruttay	1	1	5	do. do. 13th Jany. to 11th Feby.	15th Sept to 14th Oct. 12th April to 11th May.
	3. Vellasooruttay...	1	1	5	13th May to 11th June......	15th Sept. to 14th Oct.
	4. Cooroovaragoo	1	1	5	do. do.	do. do.
	5. Cholum...	1	1	5	do. do.	do. do.
	6. Cumboo...	2	2	6	13th May to 12th July......	do. 14th Nov.
	7. Colevaragoo............ ..	1	1	5	15th July to 24th August .	15th Nov. to 14th Dec.
	8. Tholayvirichangavoroo.	1½	1½	5	15th July to 29th August...	30th Oct. to do.
	9. Peroomvaragoo...	1	2	7	15th July to 24th August..	13th Jany. to 11th March.
	10. Yelemvaragoo............	1	1 & 10 days	5	15th Aug. to 13th Sept......	14th Dec. to 22nd Jany.
	11. Sagappoocholum...... ..	1	1½	5	15th Sept. to 14th Oct......	28th Dec. to 11th Feby.
	12. Maduckoocholum	1	1	5	15th Nov. to 14th Dec.......	12th March to 10th April.
	13. Munjacholum......	1	1	5	14th Dec. to 12th Jany......	12th April to 11th May.
	14. Cumbunchamay.........	1	1	3	15th July to 13th August...	15th Sept to 14th Oct.
	15. Carinchamay	1	1	4	15th Aug. to 13th Sept......	15th Nov. to 14th Dec.
	16. Thanay......	1	1	3	15th July to 13th August...	15th Sept. to 25th Oct.
	17. Muccasolum...	1	1	4	13th May to 11th June... 15th July to 13th Aug.... 13th Jany. to 11th Feby..	15th Aug. to 11th Sept. 15th Sept. to 14th Oct. 12th April to 11th May.

Poonjah or Dry Ground.	***Pulse.***					
	18. Coorolloo	1	1	4	13th May to 11th June	15th August to 13th Sept.
	19. Parelloo	1	1	4	15th Sept. to 14th October.	14th Dec. to 12th Jany.
	20. Toverye	1	1	7	15th July to 13th August.	13th Jany. to 11th Feb.
	21. Motchey	1	1	7	Do. Do.	Do. do.
	22. Green Gram 23. Black Gram 24. Horse Gram	1½	1	5	15th Sept. to 30th October.	Do. do.
	25. Bengal Gram 26. Cooloo Caramany	1½	1	4	15th Nov. to 28th Dec.	11th Feb. to 11th March.
Nunja Thottakal or Garden Land.	***Garden Produce.***					
	1. Chillies	2	2	5	12th Nov. to 12th January.	11th Feb. to 11th April.
	2. Tobacco	1	1	6	14th Dec. to 12th January.	13th May to 11th June.
	3. Senumboo	1	1	4	Do. Do. ...	12th March to 11th April.
	4. Green Ginger	1	1	6	13th March to 11th June, & 15th Sept. to 14th Oct ...	16th Oct. to 4th Nov., & 11th Feby. to 11th March.
	5. Brinjal	1	1	3	13th May to 11th June, 15th Nov. to 14th Dec., & 13th January to 11th Feb	15th July to 13th Aug., 13th Jany. to 11th Feb., & 12th March to 10th April.
	6. Benday	1	3	6	11th Feb. to 11th March, and 12th March to 11th April	13th May to 13th August, & 13th June to 13th Sept.
	7. Morry Paval	2	2½	5	11th Feby. to 10th April...	13th May to 29th July.
	8. Cootchipaval	2	2	6	13th June to 10th August.	15th Sept. to 14th Dec.
	9. Podalam	2	2	6	Do. do. ...	Do. do.
	10. Pooseny	2	2	8	Do. do. ...	14th Dec. to 11th Feb.
	11. Colyana Pooseny	2	2	8	Do. do. ...	Do. do.
	12. Averay	1	4	8	15th July to 30th August...	15th Nov. to 11th March.
	13. Peerkey	1	2	4	Do. do. ...	15th Sept. to 14th Nov.
	14. Soray	1	2	4	Do. do. ...	Do. do.

Statement shewing the period the several descriptions of grains, &c., are sown and cropped in the District of Chingleput.

Description of Land.	Description of Garden Produce.	Total period of the process of Sowing.	Total period of process of Cropping.	No. of months crop remains in the Ground.	Period of Sowing.	Period of Cropping.
		Months.	Months.			
Nunjah Thottakal, or Garden Land.	15. Coda Pooseny............	1½	2	6	11th February to 26th Mar.	13th June to 13th August.
	16. Vellary.....................	3	3	3	11th February to 12th May	12th April to 30th August.
	17. Pootchecca Malura......	1	1	4	13th May to 11th June, & 11th Feby. to 11th March	15th Aug. to 13th Sept. & 13th June to 12th July.
	18. Mooloo Vellery..........	1	1	4	11th Feby. to 11th March...	13th June to 12th July.
	19. Moolangy...................	1	1	2	15th Nov. to 14th Dec., & 13th May to 11th June.	13th Jany. to 11th Feb. & 15th July to 13th Aug.
	20. Cothooaray..............	1	3	5	13th January to 11th Feby. & 13th May to 11th June.	12th March to 11th June, & 15th July to 14th Oct.
	21 { Keeraythundoo, and Arakeeray.............. }	1, 1	8	9	13th January to 11th Feby.	11th Feb. to 14th October.
	22. Benday..................	1	3	12		
	Rustoly....................	1				
	Beng l....................	1				
	Red Plantain.........	1			13th January to 11th Feby	14th Decr. to 11th Feb.
	Pay Vaulay............	1			15th July to 13th August.	13th May to 11th June.
	Cottay Vaulay.........	1			15th Sept. to 11th October.	15th July to 14th October.
	Caree Vaulay..........	1				
	Putchay Vaulay......	1				
	23. Salt.........	2	5	7	14th Dec. to 11th February	11th Feb. to 12th July.

Garden Land.	1. Sugar Cane	1½	2	12	11th July to 26th March	13th Jany. to 11th March.	These are also cultivated in Nunjah land.
	2. Curney	2	2	8	12th March to 11th May	16th Oct. to 14th December.	
	3. Saping	1½	2	8	12th March to 26th April	15th Sept. to 14th November.	
	4. Saffron	1	1	9	13th June to 12th July	27th Jan. to 25th February	
	5. Varoocadalay	1	1	6	15th August to 13th September.	13th Jan. to 11th February.	
	6. Onions	1	1	5	13th January to 11th February.	13th May to 13th June.	
	7. Vully Calungoo	1	1	5	13th May to 11th June, 15th August to 13th September, and 13th January to 11th February.	15th Sept. to 14th Oct., 14th Dec. to 12th Jan. & 12th April to 11th May	These are also cultivated in Poonjah land.
	8. Indigo	1 / 2	1	4	11th Feb. to 11th March & 15th Nov. to 12th Jan.	11th Feb. to 11th March, and 13th May to 11th June	
	9. Betel	1	3	4	13th Jan. to 11th February	The cropping commences in July and continues 3 years.	
Garden Cultivation.	1. Cocoanut	1	For ever.	100	15th July to 18th August, & 13th Jan. to 11th Feb.	Throughout the year.	
	2. Palmyra	12	9	100	Throughout the year.	14th Dec. to 13th Sept.	
	3. Eachum	12	2	50	Do.	13th Jan. to 11th March.	
	4. Nut-tree	12	For ever.	40	15th July to 13th August, & 13th January to 11th Feb.	Throughout the year.	

Statement shewing the period the several descriptions of grains, &c., are sown and cropped in the District of Chingleput.

Description of Land.	Description of Flowers.	Total period of the process of Sowing.	Total period of process of Cropping.	No. of months crop remains in the Ground	Period of Sowing.	Period of Cropping.
		Months.	Months.			
Garden Cultivation.	5. Mangoe........................	1	3	70	15th July to 13th August, & 13th Jan. to 13th Feb.	12th April to 12th July.
	6. Jack........................	1	3	50	Do. do.	Do. do.
	7. Orange........................	1	4	40	11th April to 11th May, & 13th January to 11th Feb.	18th January to 12th April, & 15th Aug. to 14th Dec.
	8. Lemon........................	1	12	20	12th January to 11th Feb.	Throughout the year.
	9. Pumplemoose........................	1	4	20	13th January to 11th Feb., & 15th July to 13th Aug	12th April to 13th August.
	10. Mannulla........................					
	11. Camala........................					
	12. Cholah Chuney........................	1	4	20	13th May to 11th June, and 13th January to 11th Feb.	13th Jan. to 12th April, & 15th August to 14th Dec.
	13. Bada Chuney........................					
	14. Narthum					
	15. Cody Madalum........................		3	10		13th Jan. to 10th April.
	16. Madalum........................		3	10		Do.
	17. Banthum........................	1	2	50	Do.	13th Jan. to 11th March.
	18. Moonthiry........................		3	30		12th April to 12th July
	19. Pomaugoy........................	1	3	30	Do.	15th Sept. to 14th Dec.

Garden Cultivation.	20. Dyeing roots..............	1	1	1	13th January to 11th Feb.	15th July to 13th August
	21. Cuscus........	1	1	12	15th July to 13th August.	13th June to 12th July
	22. Elendum....................	...	3	50	......	13th January to 10th April.
	23. Wood-apple..................	...	2	50	......	15th Sept. to 14th Nov.
	24. Nagapullum........... ...	...	2	50	......	15th August to 14th Oct.
	25. Eloopa Maram.............	......	2	80	....	13th June to 13th August.
	26. Seta Maram..............	......	2	15	....	Do. do.
	27. Goa.........................	......	2	30	....	13th January to 11th March
	28. Fig...........................	......	Ever.	70	....	Once in a month.
	29. Nelly.........................	......	2	50	....	11th February to 10th April
	30. Mooroongay...............	......	......	15	....	Throughout the year.
	31. Margosa.......................	......	2	100	....	15th Sept. to 14th Nov.
	32. Tamarind...................	......	2	150	....	13th Jan. to 11th March.
	33. Thamarthumcoy.........	......	2	50	....	15th Aug. to 14th Oct.
	34. Nonamaram...............	......	Ever.	30	....	The bark is cut throughout the year.
	35. Potapulum Vare	......	......	......	....	13th June to 13th August.
Flower.	1. Mulliga..........................	1	1	20	13th Jan. to 11th Feb. and 15th July to 15th Aug.	12th April to 11th May.
	2. Moollay..........................	1	5	50	Do. do.	12th April to 13th Sept.
	3. Samunthy.....................	1	3	1	15th July to 13th Aug. and 15th Aug. to 13th Sep.	15th Nov. to 11th Feb.
	4. Nayla Sumbunghy......	12	3	1	Throughout the year.	16th Oct. to 11th Feb.
	5. Thalampoo..................	Ever.	12	Ever.	Spontaneous.	Throughout the year.
	6. Coday Sumpangy.......	12	3	10	Do.	12th April to 12th July.
	7. Castooriputtay..........	1	5	Ever.	15th July to 13th Aug. and 13th Jan. to 11th Feb.	12th April to 13th Sep.
	8. Jajee..........................	1	3	5	Do. do.	12th April to 12th July.

Statement shewing the period the several descriptions of grains, &c., are sown and cropped in the District of Chinglepnt.

Description of Land.	Description of Flowers.	Total period of the process of Sowing.	Total period of process of Cropping.	No. of months crop remains in the Ground	Period of Sowing.	Period of Cropping.
Flower.	9. Thavanum...	1	4	5	15th Nov. to 14th Dec.	14th Dec. to 10th April.
	10. Thamaray.....	12	5	Ever.	Throughout the year.	Throughout the year.
	11. Rose	12	5	do.	Do.	15th Nov. to 10th April.
	12. Moogoolum......	1	5	20	13th Jan. to 11th Feb., and 15th July to 13th Aug.	16th Oct. to 11th Feb. 15th Nov. to 11th Feb.
	13. Parijathum...	1	3	10	Do. do.	
	4. Mummathubanum	1	12	10	Do. do.	Throughout the year.
	15. Monorunjithum....	1	4	20	Do. do.	15th Sep. to 12th Jan.
	16. Cathoorooputchey... ...	1	4	1	15th Nov. to 14th Dec.	14th Dec. to 10th April.
	17. Punneerooppoo..........	1	Ever.	Ever.	13th Jan. to 11th Feb., and 15th July to 18th Aug.	Throughout the year.
	18. Nundiavattum...........	12	do.	do.	Throughout the year.	Do.

Art. III.—*Lectures on Diseases of the Eye.* By George Smith, M. D., Principal of the Madras Medical College, Professor of Ophthalmology, and Superintendent of the Eye Infirmary.

Lecture I.

The subject of "the Conjunctiva in Health and Disease, and under Injury," will occupy our attention in this and following lectures; but, before entering upon its consideration, I would offer a few remarks on the physiognomy of ocular disease, and on the exploration and medication of the eye.

With reference to the first of these points, I may observe that the experienced eye detects much of the character of a patient's disease from peculiarities in his bearing and expression, which, to the inexperienced eye seem to have little or no significance. That old man with the stoop of age, with corrugated and depressed eyebrows, peering in the direction where he supposes I am standing as if he could see me, is a case of nuclear cataract. That middle-aged man with upright figure, uncertain step, staring inharmonious eyes and vacant look is a case of amaurosis. That woman of fifty, the embodiment of mental and physical distress, to whom day and night are both alike, is a case of hopeless glaucoma. That poor woman with the ill-nourished child, want traced in every feature, with large black eyes and dilated pupils, is a case of functional amaurosis from starvation and overlactation. That little boy with blinking lids, frowning eyebrows, intolerance of light and unvascular conjunctiva, is probably a case of reflex irritation from vermination. That child with eyes closed spasmodically, with swollen abraded eyelids and watery discharge from eye and nose, is certainly a case of strumous ophthalmia; see how it buries its head in its mother's bosom, or presses its irritable eyes upon her shoulder. That middle-aged man with nuclear cataract in one eye, and an unnaturally clear black pupil in the other, led,—for he is blind—by the hand, is most probably an unsuccessful case of depression of the lens by a native operator. That patient with thick congested lids, bleared corneæ, intolerance of light and lacrymation is the subject of granular lid; and

that other with redness of the sclerotic conjunctiva out of all proportion to the vascularity of the lids, is, either a malingerer, who has created an ophthalmia to escape work, or else the unfortunate subject of barbarous native treatment. Finally, that case with swollen, erysipelatous looking lids of one eye is the subject of acute inflammation of the lacrymal sac, for in the region of the tendo oculi there is a swelling, the locality of which indicates the nature of the disease.

On the mode of submitting the eye to exploration, I have one or two hints to give. Many eyes may be carefully and satisfactorily examined without touching them at all. Eyes suffering from various diseases of the cornea, iris, lens, &c.,—if the palpebral fissure be of normal size and the eye be tolerant of light—may be examined with little or no manual interference. In the case of children, and in those suffering from spasm of the lids and photophobia, any attempt to open the lids by force is sure to end in their still more spasmodic closure. "*Arte non Marte*" must be our motto, in the managment of many of the cases which come under our treatment. The external aspect of the organ of vision is patent to us, without manual interference; for example, we readily note the condition of the eyebrows, eyelids and cilia; the state of the palpebral margins, of the caruncle, semilunar fold and lacrymal sac; the prominence or subsidence of the globe; the derangement or otherwise of the axes of vision; the presence or absence of oscillation; the condition of the curve and transparency of the cornea; the presence or absence of circumcorneal vascularity, &c. I mention these points in order to impress upon you how unnecessary it is to have recourse, in every case, to manual interference, when called upon to examine the eyes of patients suffering from ocular disease. In many instances, however, interference is not only expedient, but necessary; still, even in these cases, let the interference be as gentle as possible. Put your forefinger lightly upon the skin of the lower lid near the palpebral margin, tell the patient to look up, gently pull down the lid, and in depressing evert it somewhat by pressing backwards, and the whole lining membrane of the lid, with the caruncle and semi-lunar plait, the retro-tarsal fold, and the lower part of the sclerotic conjunctiva will come into view. Again, with the edge of the thumb applied to the skin of the upper lid, direct your patient to look down, and the condition

of the ciliary margins and of the upper half of the sclerotic conjunctiva becomes manifest. The abduction and adduction of the eye will bring more of the conjunctiva under observation. If you desire to see the lining membrane of the upper lid, gently lay hold of a few of the central cilia tell the patient to allow the lid to rest loose, raise it gently from the ball of the eye, place the blunt, unfeathered end of your pen—the last half inch of the convex surface—over the *upper* margin of the tarsal cartilage, tell the patient to look down, and by gently pressing with the pen, elevating, at the same time the margin of the lid, the little operation is completed, and the everted lid is before you. By pressing backwards the tarsal margin of the everted lid, the retro-tarsal fold will come prominently into view. Some lids are so lax that you may easily evert them with the thumb, fore and middle fingers of either hand; with the forefinger and thumb the cilia are seized, the lid is drawn from the eye and raised, whilst counter-pressure over the upper margin of the tarsal cartilage with the tip of the middle or ring finger of the same hand effects the eversion. When no cilia are present, the same object is accomplished by grasping the edge of the lid and everting it by the counter-pressure of the thumb and forefinger. Though simple operations, these manipulations require a little practice. In cases where the conjunctiva is much engorged, the upper lid spontaneously everts on elevating it by traction on the skin. Sometimes the eye closes spasmodically, retaining the lid everted; a little pressure with the brush or with the tip of the finger replaces the dislocated lid. Occasionally the eversion is but half replaced; if so, by depressing the lower lid and applying traction near the outer angle of the palpebral fissure, the lid falls readily into its natural position. I have mentioned a pen as being the means generally used in everting the upper lid; any thing of similar shape will do just as well, a probe for example, but the pen has the advantage of being less formidable looking than a probe or special instrument, and this is a point of some importance. In instances where the conjunctiva is chemosed and the cornea hidden from view, it will be necessary to raise the upper lid without everting it; this is best effected by an ocular speculum in handle, of size proportioned to the age of the patient. Before the eyes of a child can be satisfactorily examined, it is often necessary to

swathe the little patient in a sheet, and lay it upon its back on a bench. The Surgeon, seated on a chair a little higher than the bench, and with an apron over his lap, seizes the head of the child, and fixes it between his knees. The assistant, with one hand keeps the body of the child steady, and with the other depresses the lower lid. The Surgeon with his finger or with the speculum in handle raises the upper lid, examines the eye, and applies the remedies required. This is the only safe and practicable way of dealing with the majority of children. The expedient frightens them a little perhaps, but it secures the complete examination of the eye, and the safe application of the requisite remedies. There are cases where, in order to the full and careful examination of the eye of a child, it may be necessary to administer chloroform. These, however, are but few in number.

The eye is best examined in a quiet light. If there be great glare or a strong reflection upon the cornea, the patient is inconvenienced, and the Surgeon's examination is unsatisfactory. Both in examining the eye and in operating upon it, the more subdued the light the better are minutiæ seen, and this remark is applicable to the Native no less than to the European eye. The Surgeon will be much assisted in his minuter examinations of the organ of the vision, by a double convex lens of 2½ or 3 inches focus. Considerable experience is required before a facility is gained of detecting minute shades of color, &c., especially in the eye of the native. If there be mucous or purulent discharges from the conjunctiva, it is well for the Surgeon to see the eye before these are washed away. I need not dwell at greater length upon the subject of exploration of the eye; additional details will be given, from time to time, in connection with the treatment of individual diseases.

Lastly, I would solicit your attention to a list I now lay before you* of the more important formulæ in use in the Eye Infirmary.

A few words of explanation, advice and caution, as regards the treatment of diseases of the eye, may not be out of place. The eye is a sensitive, delicate, and valuable organ. Treat it, therefore, gently. Take care you do not *overdo* your treatment; avoid violent and strong remedies; be patient; be hopeful. Meddlesome ophthalmic practice is bad. If you can-

* See Appendix at the end of Lecture II.

not alleviate, do not aggravate disease. Do nothing by haphazard. Keep the affected organ clean, moderately protected but not shut out from light, at perfect rest, and allow the access to it of fresh air. Study your patient's feelings as regards the temperature of lotions, &c. Avoid poultices, except in affections of the lids, and in each individual case ask yourself this question before initiating treatment,—is this disease a local one "pur et simple," or is it constitutional as well as local? A local disease is best treated by local remedies; a constitutional affection demands constitutional as well as local treatment. Other questions will occur to you, such as, what is the stage of the disease? Is the affection simple or complicated? Has treatment aggravated the symptoms? Are all the morbid appearances results of the *present* disease? What are the habits and constitution of the patient? What do the look, tongue[1] and pulse indicate? Should I support or depress the vital powers?

Treat not *names* but *things*. Remember that violent local action is quite compatible with an enfeebled general system. In your ophthalmic experience in India, for one patient whose system you will be called upon to depress, you will find nine whom you must support with good diet, tonics, and even with stimulants. In one word, let common sense supplement the principles of treatment detailed in lectures and in text books. See that you are treating the disease which is actually before you, and not the mere name of a disease.

Fomentations are valuable remedies, if used with discretion. The poppy-head fomentation has little to recommend it beyond the heat and moisture it supplies; the anodyne effect of the poppy must be very trifling. Opium or extract of Belladonna may be added, if deemed advisable. The other three formulæ[2] given contain Belladonna, and may be used, either as simple fomentations, or for the purpose of steaming the affected eye. In using them the patient should be directed to avoid inhaling the steam by nose or mouth. If steaming is to be used, the solution may be placed in a jug with a narrow mouth, round which should be tied a napkin or towel on which the orbit may rest, so that the eye may be exposed to the full action of the warm medicated vapour. The toxic action of Belladonna takes place rapidly if the steam be inhaled by the mouth or nose.

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(1). The tongue is no guide, if the patient be a native and chew betel.
(2). Vide Formulary.

Warmth with moisture is often applied to the eye by means of a compress. In this way the soothing effects of a fomentation are secured, whilst the tendency to congestion induced by a simple fomentation is partially avoided by the pressure of the pad. The exact therapeutic action of cold, heat, and pressure upon the circulation of the eye should be carefully observed, so that a proper selection of the application may be made according to the circumstances of the case.[1]

Cataplasms are rarely applied in diseases of the eyeball, if we except abscess; their application to ordinary ophthalmias is most pernicious. In inflammations and abscesses of the lids they prove useful. As a general rule, I seldom employ them. Ice and iced-water, which, *a priori*, would be thought to exercise great control over inflammations of the eye, are found, in practice, to fall short of our expectations. The patient generally complains of uneasiness and discomfort, and willingly exchanges them for cold water, or, for fomentations. Not long ago it was proposed to keep up the application of cold to an affected eye by *irrigation* with water, or by the application of moistened clay. The former suggestion is inconvenient and, practically, is of little value, and as for the latter, I have given it up after a fair trial. The weight of the clay is an objection. Perhaps the best way of applying cold and moisture continuously to the eye is by soaking a slice of stale bread (freed of crust) in cold water, placing it between folds of fine muslin, and laying the cold poultice in contact with the affected organ.

Eye Drops[2] are generally applied to the conjunctiva by means of a quill, or of a medium-sized camel's hair-brush. I prefer the latter mode except in the case of wine of opium, which is generally dropped into the eye from a quill. Glass rods with a spiral twist at one extremity are also sometimes used to drop solutions into the eye.

If brushes are used, they should be kept scrupulously clean, for it must never be forgotten that all mucous, muco-purulent and purulent discharges from the eye are contagious. The employment of a disinfectant solution, as Condy's or MacDougal's, for the purpose of purifying the brushes and of destroying the virus of contagion, is absolutely necessary. Brushes, which

(1.) See an admirable paper in Vol. ii (page 126) of the Ophthalmic Review by Mr. Carter "on the local application of hot and cold compresses in ophthalmic diseases."

(2) The term Collyrium, being equally applicable to *eye-drops* and to *eye-waters* or lotions, is avoided to prevent mistake.

have been used in cases of purulent ophthalmia, in acute granular lid, and in gonorrhœal ophthalmia, should be destroyed on the termination of the treatment of the case in which they have been employed. In applying a brush filled with solution to the conjunctiva, care should be taken to apply it gently, not to sweep it roughly across the membrane. In some cases by gentle pressure of the point of the brush on the edge of the tarsus, the space between the lower lid and eyeball may be filled with the solution, and the eye bathed, as it were, in the medicated fluid.

As a rule I have found that the *acetates* agree better with the conjunctiva than the *sulphates*, hence I generally substitute for the sulphates of alum, copper, and zinc, the corresponding acetates. After applying solids, as caustic and blue stone, the part should be bathed with water to remove any fine particles of the salt which may be left behind. When applying the stronger solutions, such as the saturated solution of the sulphate of copper, the strong solution of lunar caustic, or the stronger forms of the solution of chloride of zinc, the brush should be passed lightly and briskly over the membrane, a little oil being subsequently placed on the conjunctiva to remove irritation. It is of great importance, in the treatment of conjunctival affections with eye drops, that care be taken that the remedies employed be as gentle in their character as can be devised. We more frequently *overdo* than *underdo* treatment. A delicate structure like the conjunctiva or cornea demands that its diseases be treated with care and gentleness. Lately, various remedial agents, such as Atropine, Calabar bean, Iodide of Potass, Morphia, Ergotine, Bromide of Potass and Bromide of Ammonium have been used in the form of gelatine discs, as suggested by Mr. E. Hart, or, as thin films of paper which have been steeped in solutions, as proposed by Mr. Streatfeild. These forms are handy and efficient.[1]

Eye-waters, or lotions, constitute the weaker forms of solutions entrusted to patients themselves. They may be of various strengths, according to the requirements of the case. The patient should be carefully instructed how to use them, and how often in the day to apply them. In using lotions, it is well to remember that occasional changes in their composition and temperature are beneficial, and, further, that their prolonged use is apt to keep up a chronic inflammation of the

(1) Mr. Laurence uses "atropine-points."

conjunctiva. In some cases lotions may be dispensed with, the dry, cold and moist, or warm and moist compress being substituted for them. *Dont keep the eye too wet!*

I need hardly take up your time with the mention of *liniments*, *ointments*, and *glycerinates* or *plasmata*, beyond remarking that I find the plasmata admirable substitutes, in India, for ointments. The pigments of Belladonna and of Iodine are in constant use in the Eye Infirmary. In applying the former, which is of the consistence of thick syrup or treacle, the patient closes his eye gently, and the pigment is freely applied over the closed lids and up to the margins of the orbit, or if need be, to the orbital margins, and over the temples. Care must be taken in applying the pigment of Iodine to the lids, so that none of it may run along the creases of the skin into the eye. Direct the patient to close his eyes gently, with your thumb place the skin of the upper lid on the stretch, and apply the pigment brush,—not too much loaded with pigment,—to the point most distant from the palpebral fissure; by gradually approaching the palpebral margin, as the supply of pigment decreases and the brush dries, you may paint the whole lid safely up to the margin, without running any risk of causing the severe pain which follows the contact of the fluid with the conjunctiva. The pigment has a moderate consistence given to it by the addition of gum mastick.

THE CONJUNCTIVA IN HEALTH AND DISEASE, AND UNDER INJURY.

The conjunctiva, so called from connecting the lids and globe, is the delicate semi-transparent mucous membrane of the eye. Its prolongations pass into the ducts and recesses of the lacrymal gland, into the Meibomian ducts and glands, into the follicles of the cilia, and into the derivative canals. The conjunctiva, you must remember, forms part of the great gastro-pulmonary mucous membranes, being continuous with them through the mucous membrane lining the derivative canals. It is also continuous, at the margins of the lids, with the cutaneous envelope of the body, through the intermediate muco-cutaneous tissue of the edges of the lids.

We must consequently expect that the conjunctiva will more or less distinctly sympathize with the various physiological and pathological conditions of the mucous lining and cutaneous envelope of the body.

The conjunctiva consists of four portions—the palpebral, retro-tarsal, sclerotic, and corneal.

The palpebral conjunctiva is closely adherent to the lids; it is thick, vascular and well supplied with nerves; it consists of layers of tesselated epithelial cells which are flat[1] and polygonal; these cells rest upon a layer of connective tissue,[2] indistinctly fibrillated, arranged in areolæ and containing a small quantity of yellow fibrous tissue. The palpebral conjunctiva presents numerous papillæ, simple, small and cylindrical, scattered somewhat irregularly over its surface, and are seen much magnified when the membrane is suffering from inflammatory action.

Van Roosbröeck and Bendz describe also a system of small saccular closed follicles which are limited to the palpebral portion of the conjunctiva. These closed follicles are of two kinds, the simple and agminate. The agminate are said to be pretty constantly present as a patch near the external canthus. These closed sacs are glandular, and are not to be confounded with the papillæ proper to the mucous membrane. Each closed sac contains cells, nuclear particles and fluid. They are situated in the vascular corium. Their existence in the healthy conjunctiva, I must tell you, has been denied, but the weight of evidence seems to be somewhat in favor of their presence among the normal constituents of the palpebral conjunctiva. They have been called *trachomatous* glands, and have been regarded as the pathological seat of the disease called Military or Vesicular Ophthalmia—a disease, the nature of which has been carefully investigated by the Belgian physicians.

The retro-tarsal conjunctiva is as vascular and sensitive as the palpebral portion of the membrane; it is, however, thicker and more loosely connected with the subjacent tissue, hence the more copious character of the effusions below it as the result of conjunctival inflammations. Its papillæ are larger in form, like the fungiform papillæ of the tongue, compound in structure, and arranged in lines somewhat curved and running parallel with the long axis of the lid. There is no proper basement membrane supporting the epithelium.[1] In this portion of the conjunctiva are found a few compound

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(1) Nonciliated (Kölliker). See a sketch of the anatomy of the mucous membrane of the lids, by Dr. Marston. Archives of Medicine, vol. iii.

(2) Dr. Marston (Op. Cit.) inclines to the opinion that there is no basement membrane.

acinose glands, the glands of Kraüse which open by small ducts on the free surface of the lids.(1)

The sclerotic conjunctiva, again, in passing over the front of the eyeball loses its papillary structure, becomes less dense and vascular, and is more moveable owing to the laxity of the subconjunctival tissue. It presents follicles in its structure, especially in the neighbourhood of the base of the cornea.(2) I may mention in passing, that these follicles constitute the pathological seat of the disease inaptly called pustular ophthalmia. The sclerotic conjunctiva is connected with the sclerotic by a layer of elastic submucous tissue.(3) In some cases this layer is scanty, and the conjunctiva is only moveable within narrow limits; in other cases the tissue is abundant and lax, and permits of free movement of the superjacent membrane. The occasional free movement of the ocular conjunctiva, as well as its frequent friability, should be borne in mind when we have to lay hold of the membrane with forceps.

The sclerotic conjunctiva is closely adherent to the margin of the cornea; this close union enables the oculist to steady the eyeball with the forceps when performing the operation of extraction. Passing over the convexity of the cornea, the conjunctiva loses all but its layers of epithelial cells. The deeper layers of cells being crowded together and arranged vertically, whilst the more superficial are flattened and overlap each other. It is a matter of doubt whether any basement membrane lies between these cells and the anterior elastic lamina. Bowman regards the latter structure as the basement membrane; Nunneley thinks that a separate basement membrane exists.(4) A basement membrane is certainly developed in some forms of disease, as in pterygium, in which case the hypertrophied conjunctiva, including cells, basement membrane, fibrous, nervous, and vascular tissues, can be dissected with facility from the anterior elastic lamina. In old age the conjunctiva at the margin of the cornea becomes hypertrophied, and in the native pigmented, and encroaches upon the cornea especially superiorly.

(1) W. Kraüse has counted 42 of these glands in the upper lid, and only from 2 to 6 in the lower. (Kölliker).

(2) It has no papillæ or glands, (Kölliker). "The small flask-shaped open follicles" were discovered by Manz and Stromeyer.

(3) Containing more or less fat cells. See Pinguecula or Pterygium Pingue.

(4) Kölliker agrees with Nunneley.

At the inner canthus of the eye we observe the plica semilunaris and caruncula lacrymalis. The caruncle is a small red-looking papilla, consisting of a congeries of mucous glands formed by lacunæ in the membrane. A few fine hairs often project from the surface of the caruncle, which is not infrequently pigmented in the case of the native. The fold and caruncle are the typical vestiges of what, in some animals, constitutes the third lid and accompanying gland.

The conjunctiva of the sclerotic surface is very thin and transparent in infancy and childhood; few vessels are seen on its surface. In more advanced life the membrane becomes thicker, especially in the equator of the eye; vessels of some size frequently course over its surface, and deeply pigmented patches are seen in it in the native eye. In some cases the membrane becomes very tough, in others very friable. The sclerotic conjunctiva is reproduced after ablation, as seen in cases of pterygium, and after the operation of syndectomy.

It is well to be familiar with the normal appearance of the conjunctiva. The palpebral and retro-tarsal portions are reddish, the sclerotic white and glistening. Considerable redness of the sclerotic conjunctiva, however, may be present, without constituting disease. In the native, pigmented patches are common in various parts of the mucous membrane.

The conjunctiva is susceptible of external influences and impressions. It is sensitive to cold and heat, to moisture and dryness, to wind and to general atmospheric changes. This susceptibility is more distinctly seen in the young than in the old, in the female than in the male, in the delicate than in the strong, in the European than in the Native, and in the native of the better classes, than in the poorer ranks of life. Among the poorer natives the bluntness of sensibility of the conjunctiva is often very remarkable. In connection with the lids, the conjunctiva secures at once freedom of motion of the eye with defence against external injuries, whilst its easily excited secretion facilitates the removal, from the surface of the organ, of foreign bodies. The absorbing power of the conjunctiva is very considerable, as evinced by the rapid action of contagious virus, such as the gonorrhœal, and of such poisons as Atropine and CalabarBean. As part of the secreting surface of the body, the conjunctiva takes its part in muco-cutaneous efforts at elimination,

and placed as it is at the point where a mucous membrane joins the skin, it exhibits the pathological results of irritation applied to other and very distant parts of the great mucous surface.(1) Ophthalmiæ, the result of vermination, illustrate this fact.

The conjunctiva sympathizes with irritations of the several mucous membranes of the body, with the stomach in dyspepsia, with the intestinal canal in its many derangements, with the pulmonary and genito-urinary mucous membranes, with the general cuticular surface, with the liver, kidney, and uterus, and with the system, as a whole, when under the influence of such dyscrasias as struma, rheumatism and gout. Anatomically, physiologically and pathologically considered, there are many features which are common to skin and mucous membrane, and, placed as they are continuously as the envelope and lining of the human body, we must be prepared to find the conjunctiva sharing more or less in the various morbid states which affect the surface of the body, as well as in the pathological conditions of other mucous tracts. With the gastro-intestinal mucous membrane the conjunctiva has very close sympathies.

I have mentioned that the conjunctiva is sensitive to changes of season and of temperature. A glance at the Table already given for the years 1863-64-65,(2) which exhibits the arrangement, into groups, of 6,000 cases of ocular disease, and shews the admissions to hospital, &c., in connection with the several months of the year, will prove this in a practical manner. Out of 6,063 cases of ophthalmic disease, 3,494 depended upon simple or complicated affections of the conjunctiva. Of this number, 667 cases only occurred in the cold months of November, December, January and February; 902 in the hot months of March, April, May and June, and 1,925 in the warm and moist months of July, August, September and October. January and February are the most healthy, August and September the most unhealthy months of the year in Madras, as regards conjunctival diseases. *Dry cool air suits the mucous membrane best; dry and warm*

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(1) Irritation applied to any part of a mucous membrane is often expressed, pathologically where that membrane joins the skin.

(2) See 'Madras Quarterly Journal,' No. 18, page 282.

air is less beneficial; warm and moist air, on the other hand, induces a decided proclivity to conjunctival inflammations.(1)

LECTURE II.

Three forms of inflammation of the conjunctiva will successively engage our attention: 1st, Simple Conjunctivitis, which is an inflammation of the membrane without discharge, or with only a watery or mucinous one; 2ndly, Catarrhal Conjunctivitis, or inflammation of the conjunctiva attended with a mucous or puro-mucous secretion; and 3rdly, Purulent Conjunctivitis, or inflammation of the conjunctiva attended with a muco-purulent or purulent discharge.

It must be remembered that the conjunctiva in health secretes no visible mucus; *visible mucus is an indication of disease.* From the glandular structures there issues a very slight secretion, which, in excess, becomes more or less mucinous. As the terms mucous, muco-pus and pus will be in constant use in my lectures, I quote an extract from an American author, in which the characteristics of each of these secretions are clearly and satisfactorily indicated. "When the fluid (says Dr. Woodward) is tenacious, colorless, transparent or slightly opaque and whitish, with more or less abundant epithelial elements, and few or none of the so called mucous corpuscles, it is to be designated *mucus.* When yellowish or a greenish yellow, with little or no epithelium, and abundant corpuscles, but tenacious, tough, stringy, and but little miscible with water, it should be called *muco-pus.* When the abundant corpuscles float in an albuminous serum, and are readily miscible with water, the name should be *pus.*"

In many cases these different secretions from the inflamed membrane do not represent separate diseases, but merely degrees or stages of one and the same affection; the simple conjunctivitis with its dry conjunctival surface, or, with a surface secreting watery or mucinous discharge, passes on to conjunctivitis with mucous or puro-mucous discharge, which, again, more or less rapidly terminates in a conjunctivitis characterized by muco-purulent or purulent secretion.

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(1) These facts have a practical bearing on the treatment of conjunctival disease; cold and dryness are beneficial, as opposed to warmth and moisture,

SIMPLE CONJUNCTIVITIS.

Synonyms.—Simple ophthalmia. Conjunctivite simple or phlegmoneuse. Taraxis. Ophthalmia Angularis.

Although some writers on diseases of the eye decline to recognize simple conjunctivitis as a separate disease, classing it as a minor degree or incipient stage of catarrhal ophthalmia, which latter they regard as the proper type of conjunctival inflammation, yet I cannot but think that, practically, it is advisable to confine the term catarrhal to those inflammations of the conjunctiva which are characterized by a mucous or puro-mucous discharge, restricting the term *simple conjunctivitis* to those inflammations of the membrane, which are attended by a watery or mucinous secretion, and which are not dependent upon any skin eruption. Experience proves to us that there are inflammations of the conjunctiva, which, unless maltreated, have little or no tendency to assume the catarrhal form, and, therefore, whether we choose to regard these diseases as separate affections, or as the initial stages of catarrhal inflammation, it will be equally convenient to accord them separate consideration here. In dwelling for a little upon simple conjunctivitis, I shall take the liberty of extending somewhat the term, so as to embrace not only acute and subacute conjunctivitis, whether idiopathic or symptomatic, but also the principal forms of acute and subacute congestion of the membrane, provided they be unattended with a mucous or purulent discharge. Chronic ophthalmia will be considered separately.

From whatever cause arising, abnormal vascularity of the ocular conjunctiva has peculiar features which distinguish it from vascularity of the subconjunctival tissue and of the sclerotic. The conjunctival vessels lie superficially, are seated in a lax membrane and are moveable. Exposed freely to the air, they present a florid red color, and their arrangement is reticular, the meshes becoming smaller as they approach the base of the cornea, the largest vessels being at the point where the palpebral and sclerotic conjunctivæ join.(1) The subconjunctival vessels, which are intimately

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(1) The diagram at page 18 of the text-book shows well the peculiarities of conjunctival, but indifferently the characteristics of sclerotic vascularity.

connected with the circulation of the Iris, are deeper, less numerous, less moveable, flattened looking, purple in color, and not reticulated. The sclerotic vessels when inflamed cannot be seen as vessels, the vascularity making itself known as a carmine wash round the base of the cornea, and manifestly on a deeper plane than the vascularity of the conjunctiva.

In simple conjunctivitis the peculiar type of conjunctival vascularity is well seen, often in defined patches, especially at first; in the more severe forms, the outlines of the vessels disappear in the general congestion of the membrane.

A, was seized with smart pain in one eye when proceeding by rail to Bangalore. The eye became much inflamed. Soothing remedies were applied. He returned to Madras and came under treatment. On everting the upper lid a small piece of ash from the Steam engine was removed. Vascularity of the eye great, but confined to the conjunctiva. Lacrymation considerable. Sluicing with cold water, rest to the eye, and a shade were recommended.

B, an artificer from the Gun Carriage Manufactory, presented himself complaining of pain in the eye, and a feeling as if sand had got into it. Vascularity, lacrymation, and considerable intolerance of light. On examining the eye with a three-inch convex lens, a very minute piece of steel was found entangled in the epithelial layer of the cornea. The speck was removed with Dixon's spud. Cold water bathing of the eye, and absence from work for one day were recommended.

C, a student of one of the Seminaries, preparing for his Matriculation Examination. Eye red and intolerant of light; complains of a burning and smarting sensation, especially in the evening. Sight somewhat less acute than before the attack. Sclerotic Conjunctiva congested; palpebral still more so; lids do not adhere during the night. Causes, over exertion of the eyes, the use of a bright reading lamp, and impairment of general health. Directed to give up reading by artificial light, to bathe his eyes frequently with cold water, to use a weak solution of alum in rose water (gr. 2 ad ℥) occasionally, and to take a tonic of bark and acid.

D, an Artisan from the Railway workshops; is much exposed to glare and heat of the furnace; suffers from

chronic inflammation of the conjunctiva; complains more of itching than of pain. The palpebral is more affected than the sclerotic conjunctiva. Is a spirit drinker and a heavy smoker. Advised to give up spirituous drinks, to reduce tobacco smoking to the minimum, to bathe his eyes repeatedly with cold water, to use a weak lotion of the acetate of alum, and, if practicable, to change his trade.

E, a boy with irregular vascularity of the sclerotic conjunctiva, considerable turgescence of the palpebral conjunctiva, much lacrymation, intolerance of light and corrugation of the eyebrows; skin dry; anxious expression of face. Suffers from lumbrici and ascarides. Treatment—compound santonine powder; castor oil with turpentine; enemata of lime water or of solution of salt; weak alum lotion to the eyes; afterwards, bark and acid, good food and iron.

F, a native female. Conjunctiva much inflamed; chemosis. Sclerotic conjunctiva more congested than the palpebral; much pain; sensation as if a foreign body were in the eye; lacrymation; intolerance of light. Looks as if recovering from a severe sickness. Has had fever and was unconscious for three days. Kalikum(1) was put into both eyes. Discontinuance of all native remedies; to bathe the eye with warm water; warm water compresses to both eyes, plantain leaf shade, and rest in the house. Subsequently, cold water compresses; sluicing the eyes with cold water; weak solution of the acetate of alum.

Further illustrations need not be given. The causes of the disease may be *atmospheric,* such as cold, heat, moisture, wind or other less apparent causes; or *mechanical,* as from rubbing,(2) over exertion of the eyes, dust, smoke, medicinal irritants, injuries, particular occupations, and foreign bodies generally; or *constitutional,* as from general bad health, bad habits, malaria, struma, syphilis, mercury, gout, rheumatism or leprosy, the result of derangements of the primæ viæ, of the liver, kidney or uterus. Amongst children, worms and teething are common causes of simple conjunctivitis.

The *objective* symptoms vary little in their character in

(1.) Kalikum is a native remedy for ophthalmia which contains several violent irritants.

(2.) Artificial ophthalmias from hand-rubbing and from the introduction of foreign matters into the eyes are sufficiently common in India. The observant practitioner soon learns to detect these cases.

the different cases of simple ophthalmia, but the *subjective*, depending as they do so much upon the sensitiveness of the patient's system, will exhibit every variety of modification, from the excruciating agony complained of by a European when a grain of sand has become fixed between the upper lid and eyeball, down to the total unconsciousness exhibited by the native cooly of the fact that his eyelids are encrusted with the secretion of weeks, and that his retrotarsal folds are nearly filled with dirt and dust. The European generally complains of pain,[1] stiffness, heat and discomfort in the eye, sometimes also of itching. He suffers from lacrymation, slight intolerance of light, and from a sensation as if a foreign body had gained admission to the eye. The eye, when examined, appears either partially or wholly congested and vascular; at times the disease is limited to a leash or zone of vessels, at other times the redness is equally diffused over the whole membrane. Sometimes one eye only is affected, at other times, both eyes are involved. The lids are occasionally glued together, owing to the mucinous secretion from the Meibomian ducts.

Treatment.—The *treatment* of simple conjunctivitis will depend very much upon the cause and extent of the disease. Is the cause a local[2] or constitutional one? is the primary question. Constitutional derangements must be treated on general principles; local causes of the disease must be removed; the organ should be protected from glare and put at rest; cold or warm water bathing and compresses, as the feelings of the patient may indicate, will be found of use; a leech or two to the inner canthus may remove any excessive congestion in the case of healthy and full-blooded Europeans. The pigment of Iodine applied to the upper lid will mitigate intolerance of light, and weak lotions of the acetates of lead, zinc, or alum, will prove serviceable, if not *too soon, too long* or *too often* applied. Finally, copious sluicing with cold water, the free action of atmospheric air, and the occasional use of Tannin solution will remove all remains of congestion: if not, counter-irritation may be tried. A little simple ointment applied between the lids at bed time during the continuance of the disease, will, in this and other conjunctival affections, greatly promote the comfort of the patient.

(1) This pain, in exceptional cases, is of a neuralgic character.

(2) Conjunctivitis in whatever form it occurs is generally a local disease. (Mooren.)

It is well to remember that simple ophthalmia may be both generated and kept up by confinement to a dark room, by the prolonged use of a shade or eye-compress, by the too frequent use of eye-lotions, by using lotions too strong, by too much sleep, by fullness of the portal system, by habitual constipation, and by tobacco smoking. There is considerable tendency to a recurrence of the affection, where the causes are constitutional, and where local causes continue to act upon the mucous membrane. In such cases the corneal conjunctiva is apt to suffer, and in proportion to its implication, so is the impairment of vision. When recovery from simple conjunctivitis is slow and unsatisfactory, a course of blood and nervine tonics, followed by change of air, will often, by improving the general health, cause the rapid disappearance of the remaining traces of the affection. It may be necessary for some time, especially in India, to protect the eye from glare, by recommending to the patient the use of neutral tint glasses.

CATARRHAL CONJUNCTIVITIS.

Synonyms—Catarrhal Ophthalmia. Country Sore-eye. Conjunctivite Catarrhale.

Of all diseases of the organ of vision those affecting the conjunctiva are the most numerous, and, of these again, catarrhal ophthalmia is, by far, the most common in Madras. Catarrhal conjunctivitis is an inflammation of the conjunctiva with mucous or puro-mucous discharge. By many it is regarded as the *type* of conjunctival inflammation, for, as Mr. W. Jones remarks "it is the form which inflammation of the conjunctiva excited by other causes besides atmospheric influence, injury for example, is most prone to assume." The disease may be *sporadic, epidemic,* or *miasmatic.* The disease commences with redness and swelling of the palpebral and retro-tarsal conjunctiva, including the caruncle and semi-lunar fold. There is generally very little pain, unless the sclerotic be involved. There is, however, considerable itching, some intolerance of light, a sensation as if a foreign body were in the eye, lacrymation, and serous exudation into and below the affected membrane. The discharge, scanty at first, becomes speedily mucous and abundant, and, finally, some pus appears, mixed with the more or less abundant mucous secretion. At the beginning of the disease, the patient is in-

clined to rub the eye freely to relieve the distressing itching. The result is considerable œdema just above the lower margin of the orbit, more vascularity below the equator of the globe, and more frequent minute extravasations of blood in the same locality. The affected membrane becomes uniformly red, congested, vascular and swollen; the redness passes from an increased vascularity, in which the blood vessels can be distinguished in their bright red reticulations, to an uniformly duller redness, in which separate vessels cannot be traced. As the disease subsides, the redness has more of a purple hue; the papillæ of the mucous membrane become prominent. The inner surface of the lids and the retro-tarsal fold present frequently a fine granular look, at other times the granulations are large, fungiform and red, with chemosis of the retro-tarsal folds. Exudation takes place from the free surface of the mucous membrane in the form of a flaky mucous or puro-mucous secretion; into the tissue of the membrane as a sero-fibrinous deposit, causing the conjunctiva to look chemosed; and below the membrane, in the form of a serous effusion which lifts up the conjunctiva, and causes it at times to overlap the margins of the cornea. In this locality there is sometimes a circle of blotches, the result of sero-lymphous effusions below the conjunctiva, the whiteness of which contrasts forcibly with the deep red of the rest of the mucous membrane. When the discharge from the free surface of the membrane has been suddenly checked by strong solutions of nitrate of silver, the interstitial chemosis is frequently increased, and the sub-mucous effusion may become even purulent. I have seen sub-conjunctival abscess produced in this way.

The morbid action frequently passes by the lachrymal ducts into the recesses of the lachrymal gland, causing increase of its secretion, and through the derivative canals into the nasal cavity. Œdema of both lids takes place to a greater or less extent in all well-marked cases of the disease. The ocular conjunctiva is secondarily affected, and is the first portion of the membrane which regains its normal appearance on the subsidence of the disease. The corneal epithelium is at times dulled, either in consequence of the extension of the disease, or as the result of rubbing to relieve itching, or from maltreatment and want of cleanliness. There is increased secretion from the Meibo-

mian glands which mats the cilia, and glues together the lids at night. The inflamed membrane frequently exhibits minute ecchymoses, the result of capillary rupture; these extravasations are much increased by rubbing, whether it be to relieve the sensation of itching, or to secure the success of malingering. It is well to be aware of this, because cases of catarrhal ophthalmia, induced artificially or willingly aggravated after invasion, are by no means infrequently met with in schools, asylums, among native servants, among the workmen in Government establishments, and even among sepoys. The wilful propagation of the virus was, at one time, by no means uncommon in the schools and asylums of Madras. Vigilance and severity have checked the evil, but it is not yet quite eradicated.(1)

Suspicion may be entertained when catarrhal ophthalmia becomes a more or less permanent presence in an Institution; when the sclerotic conjunctiva is congested out of all proportion to the congestion of the palpebral conjunctiva; when the lower half of the sclerotic conjunctiva is congested more than the upper; when minute extravasations are seen in considerable numbers below the equator of the eye; when there is unusual œdema of the lower lid; when foreign matter is found lodged within the lower lid; and, when one eye is affected some considerable time before the other. Much vigilance is required in India, on the part of the medical man to avoid imposition.

The disease may arise from local or from constitutional causes; it frequently follows injuries of the eye, operations on the eye, and foreign matter admitted to the eye. The causes of simple ophthalmia, already considered, are also causes of sporadic catarrhal ophthalmia, for it follows cold and heat, glare and dust, unusual exertion of the eyes, smoke, fumes, &c. Again it is often symptomatic of general derangements of the system; children suffer from it more frequently than adults; females more than males; strumous more than healthy children, more especially if they also suffer from worms. Derangements of the blood, as from rheumatism and gout, appear to occasion the disease; derangements of the primæ viæ, kidney, uterus and genito-urinary canals are, at times, accompanied by a puro-mucous discharge from the conjunctiva.

In Madras the disease is seen very frequently in its *epidemic* and *miasmatic* forms. It is generated of

(1) Catarrhal ophthalmia is readily produced by the application of chunam to the conjunctiva.

dirt, neglect, and foul miasmatic emanations, the result of the unsanitary state of the localities in which many native huts are found. In such localities it is continually present, either in its acute or chronic miasmatic form, and from such localities it may issue forth repeatedly during the year, to spread far and wide as an epidemic. It spreads by direct contagion, for all diseases of the conjunctiva with mucous, puro-mucous, or purulent discharges are eminently contagious. In certain states of the atmosphere, catarrhal ophthalmia is also *infectious,* eminently and rapidly so. Within a few hours the disease will spread through all the wards of an hospital. The disease is *endemic* in Madras, and is met with more or less at all seasons. During the rains, and in the hot months, it becomes epidemic, and affects natives inhabiting the poorer and dirtier localities very extensively. Catarrhal ophthalmia, in its miasmatic and epidemic forms, is pre-eminently a disease of the poor, the dirty, the strumous, and the famished. It forms a close alliance with congregation, dirt, bad smells, insufficient water-supply, foul air, glare and dust. It is a disease which, in its endemic form, can only be eradicated by cleanliness, segregation, good air, pure water, and sufficient food. Enlarged spleen does not constitute a more delicate test of the presence of a malarial poisoning in a locality, than does catarrhal ophthalmia of the poisoning of air, earth and water, in those unhealthy spots, in which the disease is born and bred, and from which, in certain states of the atmosphere, it issues in the epidemic form. In its endemic form it is a true miasmatic ophthalmia; the sufferers from it, more especially from the chronic form of it, remind one of the ophthalmic night men of London, and of the victims of "la mitte" in Paris. The swollen eyelids, bleared and gummy eyes, dulled corneæ, excoriated tarsal margins, beet-root colored conjunctivæ, and puro-mucous discharges sufficiently characterize the disease; the boundaries between which and purulent ophthalmias are often very indistinct.

Catarrhal ophthalmia is rare among the better classes. When it appears in European families it can generally be traced to contagion communicated by native servants; the children of the house being first affected.

The line of demarcation between simple ophthalmia and catarrhal ophthalmia is, at times, as indistinctly marked, as between catarrhal and purulent ophthalmia. Very slight

additional irritation will convert a simple into a catarrhal inflammation, and a catarrhal into a purulent.

It must be borne in mind that, in consequence of malpraxis, catarrhal and other ophthalmias undergo considerable change of character; various irritants and severe caustics are applied to the membrane by native practitioners, which have the effect of aggravating the disease and of altering most seriously its distinguishing features. In some cases I have seen sclerotitis, keratitis, perforating ulcer and staphyloma of the cornea and iris result from the native treatment of simple cases of catarrhal ophthalmia; granular lids or a state of incurable chronic ophthalmia, by no means infrequently constitute the sad sequelæ of that utter recklessness which characterizes native medication of affections of the eye.

Catarrhal ophthalmia, whether subsiding spontaneously or as the result of treatment, has a tendency to reach a stage of recovery just short of health. The remains of the disease are apt to linger in the lids, and some care is required in order that the morbid congestion may not become chronic. This chronic congestion is apt to be kept up by the prolonged use of lotions, by want of attention to cleanliness, by errors in diet, by a strumous habit of body, and by the development of granulations in the conjunctiva. This termination of catarrhal opthalmia is very common among the poorer classes of native children. Externally, the lids, especially the upper, appear much swollen and deformed; there is considerable intolerance of light; there is also a tendency to sclerotic and corneal complications. In such cases the discharge may almost entirely cease, leaving a smooth swollen vascular membrane which readily everts on raising the upper lid, and which appears like a ripe cherry; this type of the disease is accompanied with much photophobia and spasm of the orbicularis palpebrarum. The conjunctiva in such cases generally bleeds freely on being touched.

An uncomplicated attack of Catarrhal Ophthalmia occurring in a healthy person of cleanly habits, may be expected to run its course in about a fortnight, without special treatment, provided the eyes be kept clean, and frequently bathed with warm water.' The duration of the disease may, however, be curtailed to eight or ten days by judicious treatment.

Two modes of treatment have been recommended for the disease; first, the *abortive* treatment by which the disease is promptly arrested in its early stage; and, secondly, the *palliative,* by which the disease is gently influenced by mild remedial measures, the object being rather to conduct the disease safely to its termination than to cut short its natural duration. Both modes of treatment are successful, but it requires some experience to select the cases most suitable for each. It is well to remember the several stages of the affection. At first the mucous membrane is dry; the secretion which appears is watery and mucinous, then mucous, and, finally, puro-mucous, and it is by observing the character of the secretion more especially, that we are principally guided in selecting our applications to the inflamed membrane. So long as the membrane is dry or is only moistened with a watery discharge, stimulants and astringents are likely to aggravate the inflammatory action, while, on the other hand, soothing applications will afford relief. In this early stage simple water or poppy-head fomentations are to be used. When the discharge is becoming mucous, you may apply to the adult eye once or twice daily a solution of Nitrate of Silver (gr. ii. or iii. ad. ℥), directing the employment of weak lotions of the Sulphate or Acetate of Alum, of the Acetate of Zinc, or of Tannin dissolved in Glycerine. These lotions may be used warm, lukewarm, or cold as the patient's feelings shall dictate. A shade should be worn, and simple ointment used at bed-time to prevent glueing together of the lids. When the discharge becomes mucous and more abundant, a stronger solution of the nitrate (gr. v. ad. ℥) may be lightly brushed over the affected membrane once or twice a day, and the lotions may be used a little stronger. As the discharge diminishes in quantity, so ought we to diminish the strength of the applications, and, at the same time, warm lotions should be abandoned for the eye douche, or for sluicing of the eye with cold water. Should the disease lurk in the upper lid, the rapid application of a strong solution of the nitrate of silver, once every two or three days, with the external application of the Iodine pigment, and the occasional use of the Tannin solution will "speed the parting guest." You will remember that the European is far less tolerant of strong applications than the native. In the case of the former you will use solutions of nitrate of silver, &c., only half as strong as those you find necessary in the case of

the native patient. Remember, also, that the European female is more sensitive than the male, and the child than the adult. Remember, also, that the skin of some European patients is peculiarly sensitive, and that applications, such as pigment of Iodine, unfelt by one patient, cause exquisite torture to another. If the case be a fit one for the *abortive* treatment, you will find that the prompt application of a solution of nitrate of silver (gr. x.—xx. ad. ℥) by means of a brush to the affected membrane will, at times, arrest the disease. The application may be repeated twice, daily, for the first few days, and a cold water compress should be applied to the affected eye or eyes. Should the membrane become dry, swollen, and angry under the treatment, the *abortive* plan must give way to the *palliative.* While pointing out the use of caustic applications to the inflamed conjunctiva, I would here, once for all, warn you against their abuse. The most sad results follow the use of strong caustic solutions, as may be seen daily in the experience of the Eye Infirmary.

Complete segregation of the patient is required, for the disease is contagious if not also infectious. At first it is well that the patient should wear a shade, so arranged that glare be kept from the eye without excluding fresh air. As the disease subsides the eye should be freely exposed to the air, and the constant application of lotions should be dispensed with. Of course great cleanliness should be insisted upon, and such advice should be given as shall save the sound eye,—if only one eye be affected,—from the risk of contagion.

In many cases the disease occurs in young persons of a strumous habit. In such subjects it is apt to become obstinate and to end in granular lid. Boys from the several asylums and schools; children after attacks of measles and small-pox; young persons suffering from vermination; women nursing infants and haggard from want; young females with uterine derangement and patients suffering from any dyscrasia are very apt to exhibit the strumous type of catarrhal ophthalmia. In such and such like cases, the disease requires constitutional as well as local treatment. The latter must be gentle and palliative, for strong applications inevitably engender granular lid and chronic ophthalmia. Counter-irritation by means of Iodine pigment, nitrate of silver blisters, &c., are very useful, and blood and nervine tonics must be given, with good diet, and, if need be,

stimulants. These cases give much trouble, and are often only finally cured by change of air.

When the fibrous envelope of the eye is implicated in the inflammatory action, the pain becomes more decided and somewhat rheumatic in character; the intolerance of light is also greater; when the eye is examined, you will see the circumcorneal carmine blush which reveals the presence of sclerotitis. This is the disease called *catarrho-rheumatic conjunctivitis.* In such cases you must use milder solutions of the nitrate of silver, with warm solutions of the acetate of alum, to control the conjunctival affection, after you have checked the sclerotic complication by the local application of Belladonna pigment, and by the internal administration of grey powder combined with quinine and opium, or of Dover's powder; or of grey powder combined with morphia, quinine, and small doses of the tartrate of antimony. Should the sclerotic affection threaten to become chronic, then counter-irritation will be of value; subsequent benefit will be derived from a course of the hydriodate of potass or of the turpentine mixture, followed by tonics,—arsenic for example,—and change of air. In the treatment of ordinary cases of catarrhal ophthalmia, no great change in the diet is called for, as a general rule, nor is it always necessary that purgatives should be given. In this, as in all cases of ocular disease, the physician must use his common sense, withholding from the well-fed and robust what he must give to the famishing and anemic.

In some cases chemosis of the conjunctiva is a very prominent symptom. When this depends upon the mechanical irritation of rubbing, it is frequently watery like a bleb of pemphigus; when it depends upon inflammatory exudation into the tissue of the membrane itself, the swelling is generally firm, and not readily compressible; when the effusion is principally below the conjunctiva, then we see irregular white elevated patches close to the base of the cornea, at times, surrounding that organ with a circle of milky-looking elevations. These elevations are irregular in form and size, and often overlap the edge of the cornea; they depend upon serous or lymphous exudations into the subconjunctival tissue. In some cases the corneal epithelium itself becomes slightly hazy. Chemosis is best removed by pressure. In some cases the warm water compress is most useful; in others the cold water compress, and in others

the dry compress answers best. Astringents, such as the acetates of lead, alum, or of zinc, are also of great service. It was at one time the practice to scarify congested lids, and to incise the chemosed conjunctiva in cases of conjunctival inflammations of the catarrhal and purulent types; my own experience is against the practice, but in favour of pressure combined with cold or heat.

Should granulations appear in the palpebral conjunctiva, whether as minute scattered miliary papules, lighter in color than the surrounding tissue, or as more prominent, irregular, and flattened elevations, care should be taken to conduct the constitutional and local treatment judiciously; otherwise a state of chronic persistent ophthalmia may be induced, which may ultimately most seriously impair vision,—a condition of the mucous membrane in which constant recurrences of disease may be expected. Gentle local astringents as the acetate of copper, the eye douche and counter-irritation should be had recourse to, whilst the requirements of the general system should also be attended to in the shape of tonics, good food, stimulants, and change of air. In such cases the careful employment of mechanical pressure to the affected lid, either in the form of a compress secured with a bandage, or in that of a compressorium, such as has been suggested by Dr. Stokes, is likely to prove of great service.

Remember that, in native practice, you may have a violent simple ophthalmia superadded to the catarrhal attack, or complications of the cornea, and, in such cases, you must soothe and calm before you can stimulate or astringe. Secure rest for the affected eye, absence of glare, free admission of fresh air, and perfect cleanliness; change your astringent applications from time to time, and change the temperature of your lotions to suit the feelings of your patients. In this way you will be able to conduct to a successful termination the great majority of cases of simple catarrhal ophthalmia.

Should an epidemic of catarrhal ophthalmia appear in an asylum or school where many children are congregated together, the following sanitary precautions—amongst others—should be adopted:—

Inmates.

1. The inspection of the inmates twice daily, in order that such as have congested lids or discharges from the eyes may be transferred to Hospital; the careful

regulation of basins, towels, &c., so as to arrest the spread of the disease; the insisting upon strict cleanliness and on daily exercise in the open air of the inmates; the segregation of the affected, and the careful prevention of all communication between them and those yet unaffected; the watching against the artificial spread of the disease, and the adoption of severe measures for the punishment of offenders.

Asylum and Hospital.

2. The setting apart of separate wards for the treatment of ophthalmic cases, and the separation of the less severe from the more severe cases; the thorough cleaning, airing and white-washing of all rooms, wards, and dormitories; the diminution in the number of beds in the dormitories; the increase of the ventilation of each room and ward, taking care, however, to exclude glare and dust; the banishment of sponges from the Hospital, and the substitution for them of tow, cotton wool, or lint.

The neighbourhood.

3. The careful inspection of the neighbourhood, so as to detect the existence of unsanitary conditions, and to trace out the probable source of the disease; this includes inspection of the parcherries and bazaars, and the adoption of means for preventing communication with infected localities.

These general precautions would, with easily-understood modifications, be applicable to a regiment of soldiers in which catarrhal or purulent ophthalmia had appeared in an epidemic form. In such a case the medical officer would have to trace out the cause and source of the disease. To this end he would have to inspect the barracks, its neighbourhood, the parcherry and bazaars; he would have to look to the health, duties, diet, and exposure of the men; he would have to provide for the segregation of the affected, and for the due sanitation of the barracks and hospital; he would have to place basins, baths, towels, lavatories under surveillance; he would have to institute frequent inspection parades and to protect the men from glare, dust, and infected localities; he would have to prolong the convalescence of affected men, and be on his guard against the appearance of granular lids; he would have to consider the climate of the station, the peculiarities of the season, the locality of the barracks, and general endemic constitution of the locality; he would have,

finally, to obtain the hearty co-operation of the military authorities in maintaining a vigilant and stringent surveillance of the regiment, and of all the circumstances which are acting upon, and influencing its health.[1]

APPENDIX.

Formulæ extracted from the Formulary of the Eye Infirmary; to which are added a few other prescriptions.

B. P., *i. e.* British Pharmacopœia.
M., *i. e.* Moorfields' Pharmacopœia.[2]

FOTUS.—FOMENTATIONS.

1. Poppy-head fomentation (B. P.)
Take of Poppy Capsules, bruised and freed from seeds ℥ iv.
Distilled water Oiii.
Boil for 10 minutes and strain.

2. Belladonna fomentation (M).
Take of Extract of Belladonna ʒ i.
Boiling water Oi.
Dissolve.

3. Belladonna and Opium fomentation.
Take of Extract of Belladonna ʒ i.
Extr. of Hyoscyamus ʒ i.
Extr. of Opium ʒ i.
Boiling water Oi.
Dissolve.

4. Atropine fomentation.
Take Solution of Atropine (gr. 2 ad. ℥) ʒ i.—ʒ ii.
Boiling water Oi.
Mix.

GUTTÆ.—EYE-DROPS.

1. Alum Eye-Drops.
Take of Alum gr. i.
Distilled water, or Rose water ℥ i.
Mix.
(and various strengths from gr. i. to gr. xxx. per ounce.)

2. Sulphate of Copper Eye-Drops.
Take of Sulphate of Copper gr. i.
Distilled water, or Rose water ℥ i.
Dissolve.

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(1) See an admirable paper on Ophthalmia, with supplement, in the Archives of Medicine, vol. iii, page 183, by Dr. Jeffrey Marston, Assistant Surgeon, Royal Artillery.

(2) The Royal London Ophthalmic Hospital.

(and various strengths from gr. i., per ounce, up to a saturated solution).

3. Sulphate of Zinc Eye-Drops.

Take of Sulphate of Zinc. gr. i.
Distilled water, or Rose water ℥i.
Dissolve.

(and various strengths from gr. i. to grs. iv. per ounce).

4. Acetate of Alum Eye-Drops.

Take of Sulphate of Alum ʒi.
Acetate of Lead ʒi.
Wine of Opium ʒiiss.
Water ℥iii.

Separate the Sulphate of Lead ; heat gently the remaining fluid and filter, adding the Wine of Opium.

5. Acetate of Copper Eye-Drops.

Prepared as the Acetate of Alum Eye-Drops.

6. Acetate of Zinc Eye-Drops.

Take of Acetate of Zinc gr. i.
Distilled water, or Rose water ℥i.
Mix.

(and various strengths from gr. i. to grs. vi. per ounce.) This preparation may also be made as the Acetate of Alum Eye-Drops.

7. Acetate of Lead Eye-Drops.

Take of Acetate of Lead ʒss. ad. ʒi.
Distilled vinegar ♏. xv. ad. ʒss.
Distilled water ℥vi.
Dissolve.

(and various strengths up to a saturated solution).

8. Sub-acetate of Lead Eye-Drops (B. P.)

Take of Solution of Sub-acetate of Lead ʒii.
Rectified Spirit ʒii.
Distilled water ℥xixss.
Mix, and filter through paper.

9. Chloride of Zinc Eye-Drops.

Take of the Chloride of Zinc gr. i.
Distilled water ℥i.
Dissolve.

(and various strengths from gr. i. to grs. xxx. per ounce).

10. Corrosive Sublimate Eye-Drops.

Take of Chloride of Mercury gr. i.
Hydrochlorate of Ammonia grs. viii.
Distilled water ℥viii.
Dissolve.

11. Hydrocyanic Acid Eye-Drops.

Take of Diluted Hydrocyanic Acid ʒi.
Distilled water ʒvii.
Mix.

12. Wine of Opium Eye-Drops.

(used either pure or diluted).

13. Nitrate of Silver Eye-Drops.

Take of Nitrate of Silver gr. i.
Distilled water ℥i.
Dissolve.

(and various strengths from gr. i. per ounce up to a saturated solution of gr. xx. per drachm.)

14. Tannin Eye-Drops.

Take of Tannin ʒss.—ʒi.
Glycerine ʒii.
Water ʒv.
Dissolve and filter.

15. Liquor Potassæ Eye-Drops.

Take of Liquor Potassæ ʒi.
Distilled water ℥iv.
Mix.

(Liquor Potassæ is also used undiluted, and diluted of various strengths.)

16. Turpentine Eye-Drops.

Take of Oil of Turpentine ʒi.
Olive Oil ʒiii.
Mix.

17. Atropine Eye-Drops.

Take of Sulphate of Atropine gr. ii.
Diluted Nitric Acid ♏. iii.
Distilled water ℥i.

Dissolve the atropine in the acid and add the water. (Various strengths are used from grs. ii. to grs. viii. per ounce.)

18. Iodide of Potass Eye-drops. (M).

Take of Iodide of Potass gr. iii.
Distilled water ℥i.
Dissolve.

N. B.—A little glycerine is a useful addition to most of the eye-drops.

LOTIONES.—EYE WATERS.

These consist of weaker solutions of the Eye-drops. The following lotions may be added to the list:—

1. Vinegar Lotion.

Take of Distilled Vinegar ʒss.
Water ʒviiss.
Mix.

2. Aromatic Vinegar Lotion.

Take of Aromatic Vinegar ♏ v.
Spirit of Nitrous Ether ʒi.
Water ℥vi.
Mix.

3. Arnica Lotion.

Take of Tincture of Arnica ʒii.
Distilled water ℥iv.
Mix.

4. Acetate of Ammonia Lotion. (1)

Take of Opium Wine ♏ xx.
Solution of the Acetate of Ammonia ℥ i.
Mix.

5. Acetate of Ammonia Lotion. (2)

Take of Solution of Acetate of Ammonia ℥i.
Glycerine ʒii.
Rose water ℥ii.
Mix.

PULVERES.—POWDERS.

1. Calomel.
2. Acetate of Lead finely pulverized.

These powders are used (1) for insufflation, and (2) for application in quantity to lids affected with granular disease.

LINIMENTA.—LINIMENTS.

1. Chloroform Liniment. (M.)

Take of Chloroform ℥i.
Olive Oil ℥i.
Mix.

2. Belladonna and Chloroform Liniment.

Add Extract of Belladonna ʒi. to the Chloroform Liniment.

3. Aconite Liniment (No. 1.)—(B. P.)

Take of Aconite root in powder ℥xx.
Camphor ℥i.

Rectified Spirit *f* ℥xxx. or a sufficiency.

Moisten the aconite root with a portion of the spirit, and macerate for seven days; then percolate into a receiver containing the camphor, until the product amounts to one pint.

4. Aconite Liniment (No. 2)—(M).

Take of Tincture of Aconite ℥i.
Glycerine ℥i.
Mix.

PLASMATA.—GLYCERINATES.

1. Belladonna Plasma (or Belladonna Pigment).

Take of Extract of Belladonna ʒii.
Glycerine ʒi.
Water ʒi. Mix.

This plasma may be made of various strengths. It is expedient not to increase the quantity of glycerine, otherwise absorption by the skin is interfered with.

2. Sulphate of Copper Plasma. (M.)

Take of Sulphate of Copper gr. xxiv.
Starch ʒiss.
Glycerine ʒxss.

Dissolve the sulphate of copper in the glycerine; add the starch. Boil on a slow fire, stirring until the plasma becomes of the proper consistence.

3. Plasma of Ammoniated Mercury. (M.)

Take of Ammoniated Mercury ʒss.
Starch ʒiss.
Glycerine ʒxss.

Mix the mercury with the starch, and then add the glycerine; proceed as with Plasma No. 2.

4. Plasma of the Nitrate of Mercury. (M.)

Take of the Nitrate of Mercury gr. xl.
Starch ʒiss.
Glycerine ʒxss.
Prepare as in Plasma No. 2.

5. Plasma of the Red Oxide of Mercury. (M.)
Take of the Red Oxide of Mercury. gr. xlv.
Starch ʒiss.
Glycerine ʒxss.
Prepare as in Plasma No. 2.

Pigmenta.—Pigments.

1. Iodine Pigment. (M.)
Take of Iodine ʒi.
Rectified Spirit ℥i.
Gum mastick ʒss. Dissolve.

(In Europeans and in persons of delicate skin this pigment should be used of less strength : the Iodine being reduced from ʒi to ʒss.)

Unguenta.—Ointments.

1. Ointment of the Nitrate of Mercury (M.)
One part of the ointment (P. B.) to seven of lard ; a milder ointment has one part to nine of lard.

2. Ointment of the Red Oxide of Mercury (M.)
One and a half parts of the ointment (P. B.) to six and a half parts of lard.

3. Simple ointment. (M.)
Take of Wax ʒii.
Lard ʒvi. Melt together.

4. Ointment of the Yellow Oxide of Mercury.
(Pagenstecher's Ointment.)
Take of the Yellow Oxide of Mercury ʒi.
Mixed Fats ℥i.
Mix carefully and thoroughly.

Generalia.—General Prescriptions.

1. Nervine tonic.
Take of Tincture of Nux Vomica ʒiv.
Tinct. of Calumba ℥iss.
Compound Tinct. of Cinchona ℥iss.
Mix.

For adults a tea-spoonful up to a dessert spoonful twice or thrice daily, one hour before food.

3. Turpentine Mixture.

Take of Oil of Turpentine ℥i.
Mucilage ℥ii.
Cinnamon water ℥vi.
Mix.
Dose ʒii. to ℥ss. three times daily.

4. Compound Santonine Powder.

Take of Santonine ʒi.
Ginger ʒi.
Seeds of Butea Frondosa ʒiii. Mix.

(The seeds are to be decorticated and powdere

Dose for an adult 20 grains morning and even lowed on the third day by a dose of Castor oil a pentine.

5. Hypodermic Injection.

(Prof. von-Graëfe's).

Take of the Acetate of Morphia gr. iv.
Distilled Water ʒi.
Mix.

One grain in every 15 minims; dose from 5 to 10

ART. IV.—*Report on the Febrifuge Properties of the Leaves of Chinchona.* By W. N. CHIPPERFIELD, Acting Physician, General Hospital.

***Proceedings of the Madras Government, Revenue Department,* 23rd *May* 1866.**

No. 421. Read the following letter from the Officiating Principal Inspector General, Medical Department, to the Secretary to Government, Revenue Department, dated Fort Saint George, 15th May 1866, No. 173 :—

1. I have the honor to forward a report on the febrifuge properties of the leaves of Chinchona, as directed in Proceedings of Government, 12th June 1865, No. 1283, Revenue Department.

Dated 7th May 1866.

2. Dr. Chipperfield used the remedy in twenty-six cases of fever, but it was only in cases Nos. 6, 11, 16, 24, and 26, given in the table, that it can be considered as having acted as an antiperiodic, and these were evidently very mild cases of fever. Dr. Chipperfield observes " a more extended trial of the leaves is required before any correct conclusion can be arrived at, as to their value as an antiperiodic." Instructions for a fair trial of the leaves and twigs are embodied in the letter about to be issued to the Medical Officers selected to carry out the testing of the alkaloids. I respectfully suggest that Dr. Chipperfield's report be printed and circulated to these gentlemen.

3. It is not said when the leaves were gathered, but it must have been recently. I do not consider that the dryness described by Dr. Chipperfield materially affected their medical powers, but should it be found to be the case, their use must be very limited

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Report on the febrifuge properties of the leaves of Chinchona.

1. On the 29th of November 1865 I received two wax-cloth parcels, containing, the one 8 lbs. of the leaves of Chinchona Succirubra, and the other 8 lbs. of the leaves of Chinchona Condaminea, with instructions to make trial of various preparations of these leaves in cases of fever. The leaves were not in such a fresh state as I expected to find

them, but were so nearly dry as to be capable of being rubbed into a coarse powder.

2. I wrote out the following formulæ, and gave them to the Superintendents of the Dispensing Department, for their guidance :—

I.—Cold Infusion of Chinchona leaves.
Take of Leaves of Chinchona 1½ oz.
Diluted Sulphuric Acid ¼ oz.
Cold water 20 oz.
Infuse for twelve hours and strain.

II.—Acid Decoction of Chinchona leaves.
Take of Chinchona leaves 1½ oz.
Diluted Sulphuric Acid ¼ oz.
Cold water 20 oz.
Boil for ten minutes and strain.

III.—Stronger Decoction of Chinchona leaves.
Take of Chinchona leaves 1 oz.
Cold water 6 oz.
Boil for ten minutes and strain.

3. There was some waste in consequence of decomposition occurring in the infusion, which was necessarily kept ready-prepared in case of its being required; but by management this waste was reduced to the lowest possible amount.

4. The appended table shows the result of the trial. Preparation No. I. was prepared entirely from the Chinchona Succirubra, and was administered in doses of 3 or 4 oz., three times daily, in cases Nos. 1 to 12 in the table.

5. Preparation No. II. was prepared partly from the Chinchona Succirubra and partly from the Chinchona Condaminea, and was administered in doses of 4 oz., thrice daily, in cases 13 to 20.

6. Preparation No. III. was prepared entirely from the Chinchona Condaminea, and was administered in doses of 6 oz., twice daily, in cases 21 to 26.

7. I observed no difference, as regards febrifuge property, in the leaves of the two species of Chinchona submitted to trial; but, although the table does not show this, it appeared to me that preparation No. III. was the most effectual.

8. Preparations Nos. I. and II. were used as a tonic, with the best results, in doses varying from 2 to 4 oz., thrice daily, by nineteen patients, some of whom had previously suffered from fever and remained in a debilitated condition.

9. I think that cases Nos. 4, 5, 7, 13, 14, 15, 17, 21, and 23 may fairly be removed from the table, as they were cases either of simple febricula, or of such mild intermittents as might readily have been cured without resorting to any preparation of Chinchona.

10. So far as my experience enables me to judge, I am led to the conclusion that in simple cases of mild intermittents the remedy may be trusted to, but that in severe cases of malarious fever it is not one on which any great reliance can be placed, and that it is in no way comparable to the extracted alkaloid salt, Disulphate of Quinine, as a genuine trustworthy antiperiodic.

11. I observe that in Mr. Howard's Report on the Chinchona leaves from Ootacamund, (Madras Quarterly Medical Journal, Volume VII., page 425,) it is stated that the quantity of Quinine contained in the leaves is very small, viz., 0·11 per cent. of alkaloid, soluble partly in alcohol and partly in ether, and 0·19 per cent. contaminated with an astringent extractive matter. Granting that 0·30 per cent. of this impure Quinine is obtainable from the leaves, and that all of this is taken up by the water of the infusions and decoctions I had made, one pint of preparation Nos. I. and II., would contain not quite 2¼ grains of Quinine, and each dose of 4 oz. would contain less than ½ a grain; and the dose, 6 oz., of preparation No. III. would contain about 1⅓ grain. But it cannot be supposed that any thing like the whole quantity of the Quinine is taken up by the water. However, as Mr. Howard points out, the Kinovic acid, which is abundant, may assist the action.

12. It appears to me that a much more extended trial of the leaves is required before any correct conclusion can be arrived at as to their value as an antiperiodic, but that the bitter infusion acts well in giving tone in cases of atonic dyspepsia and of debility, especially after fever; and I consider that the Infusum Chinchonæ Foliorum would be a useful addition to our list of bitter vegetable infusions.

13. Should the Principal Inspector General be of opinion that further experiment is desirable, I shall be happy to carry out his views on being furnished with another supply of the fresh leaves.

Table of Fever Cases treated by preparations of Chinchona leaves.

No. of case.	Type of Fever.	No. of days taking the remedy.	No. of doses taken.	No. of days Fever was Present.	No. of days Fever was Absent.	Remarks.
1	Tertian......	6	18	1	5	Cured, but had taken large doses of Quinine for five days previous to commencing the remedy.
2	Remittent...	8	24	8	0	Fever uninfluenced by the remedy.
3	" ..	9	27	0	9	This was a relapse. Took Quinine for three days before commencing the remedy.
4	Quotidian...	5	15	1	4	A mild case. Cured.
5	" ...	5	15	1	4	Do. do.
6	" ...	6	18	3	3	Cured.
7	" ...	2	6	0	2	Do. A mild case.
8	" ...	4	12	4	0	Remedy without effect.
9	Tertian ...	6	18	3	3	Do. cured by Quinine.
10	Quotidian...	1	2	1	0	Remedy nauseated patient. Do.
11	" ...	6	18	2	4	Cured.
12	" ...	5	15	2	3	Quinine resorted to.
13	Febricula ...	5	15	1	4	A simple case. Cured.
14	" ...	3	9	0	3	Do. do.
15	" ...	3	9	0	3	Do. do.
16	Quotidian...	6	18	2	4	Cured.
17	" ...	5	15	0	5	Do. A mild case.
18	" ...	5	15	5	0	No effect. An obstinate case in a Bombay Marine. Transferred to Bombay.
19	" ...	3	8	3	0	Cured by Arsenic.
20	" ...	13	33	2	11	On each day when fever occurred took grains 15 of Quinine.
21	Common continued.	7	21	0	7	Cured.
22	Remittent...	10	20	8	2	A very obstinate case, still under treatment.
23	Febricula ...	1	2	0	1	A very mild case. Cured.
24	Quotidian...	3	6	1	2	Do. do.
25	" ...	5	8	4	1	Quinine resorted to.
26	" ...	4	8	2	2	A mild case. Cured.

(Signed) W. N. CHIPPERFIELD, Asst. Surgeon,
Acting Physician, General Hospital.

No. 422. Order thereon, 23rd May 1866, No. 1,229.

1. Mr. Shaw will apply direct to Mr. McIvor for Chinchona leaves, as required.

2. The experiment should be tried with freshly gathered as well as with dried leaves. Even if drying the leaves affects their febrifugal qualities, their use will still be general among native growers, and it is desirable that this question, viz., the effect of drying the leaves, should be tested carefully.

(True Extract.)

(Signed) J. D. SIM,

Secretary to Government.

(True Copy.)

(Signed) W. R. CORNISH, Surgeon,

Secy. to Pl. Inspr. Genl., Mdl. Dept.

Art. V.—*On the Oxidation of Organic impurities in Water.* By W. R. Cornish, Surgeon; Secretary, Principal Inspector General, Medical Department.

A few weeks since the following letter was placed in my hands by Mr. Chipperfield, the Editor of this Journal, and I am glad to avail myself of the present opportunity of bringing Mr. Condy's suggestions to the notice of the profession in India, feeling that the subject has not yet met with the attention that it really deserves :—

Devonshire House,
Battersea, 9*th April,* 1866.

To the Editor of the

"Madras Quarterly Journal of Medical Science."

Sir,

Will you oblige me by handing the accompanying pamphlet on the "Purification of Water and Air" to Mr. W. R. Cornish, whose paper on the Dietaries of the Madras Prisons has been reproduced in the "Social Science Review" for this month ?

Seeing that that gentleman is familiar with the use of the permanganate test for organic impurities in water, the knowledge and employment of which date from the introduction of my Patent Fluid, it has seemed to me that he might be interested to know that the same substance possesses the property of economically, rapidly, safely, and completely freeing water from all trace of organic taint. This important fact if generally known to, and taken advantage of, by residents in India, would be of incalculable service to them. As a preventive of cholera, I can conceive of nothing more likely to be beneficial. My conviction in this respect has received strong confirmation from the very favorable results obtained by Madras Medical Officers from the administration of Condy's Fluid in the treatment of cholera. In the "Medical Times and Gazette" of 10th March last, I observed in a letter by Dr. Howard B. Montgomery, on the subject of the treatment of cholera, a table, from which it would appear that in the hands of Mr. Evezard and Dr. Mackay the administration of Condy's Fluid resulted in a mortality no higher than 5·8 per cent. From what I know of the action on the human economy of the alkaline permanganates, I feel confident that if they are freely used and prescribed early, still more favorable results will be obtained.

I have respectfully called the attention of the Army Medical authorities to the advantages which would be found from the general use by the troops of this means of purifying water, but hitherto

without the least success. If you or Mr. Cornish will only take the trouble to verify my statements, I feel certain that you will not fail to see the importance of them for the inhabitants of India generally, and particularly for the army.

I am, Sir,

Your's obediently,

H. B. Condy.

Mr. Condy's pamphlet "On the Purification of Water and Air" I had already seen, and in some rough experiments with specimens of foul water performed about three years ago, I became aware of the fact that the alkaline permanganates were extremely effective in the oxidation of the organic impurities of water, and the thought then occurred to me that it would be quite practicable to use the "patent fluid" prepared by Mr. Condy as a purifyer of drinking water, but want of leisure and opportunity prevented my determining this point to my own satisfaction.

Since the receipt of the letter above given, I have felt it incumbent upon me to take the trouble to verify Mr. Condy's statements, by a few simple experiments, and the conclusions I have come to may not be destitute of interest at the present time, when the impurity of the potable waters of India is attracting so much attention as a possible source of disease.

Mr. Mayer* in his excellent "*Note on the Magnetic Oxide of Iron as a means of purifying water*" has, I think, clearly shown that the much vaunted action of this substance, and of many others which enter into the composition of filters, is more or less mechanical. According to Mr. Mayer, the magnetic oxide of iron removes very little more organic matter from water than does the Swedish filter paper of the chemist's laboratory. More recently it has been asserted that the oxide prepared by a special process (subjected to a red heat when mixed with a proportion of sawdust) does really possess a powerful influence in the oxidation of the organic impurities of water. This action, however, I suspect is more temporary than lasting.

I am afraid that, notwithstanding all the attention that has been given to the subject of filtration, science has not yet placed us in possession of a perfect filter, that is, of one

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*Madras Quarterly Medical Journal, vol. ix, page 219.

that exerts both a chemical and a mechanical action, and that can be depended upon to work uninterruptedly in the decomposition and separation of organic particles, suspended or dissolved in water.

A filter lately introduced by a Mr. Lipscombe is asserted to be capable, amongst other things, of removing salts of *lead* or *lime* which may be dissolved in water. The fact is denied by Mr. W. Valentin of the Royal College of Chemistry. With regard to a superabundance of lime in the form of carbonate, this gentleman tells us* that a filtering bed containing an admixture of caustic lime, would have the power of fixing the free carbonic acid and of precipitating the carbonate of lime, but that "the filtered water would become alkaline." Sulphate of lime would not be affected either by boiling or by filtering through caustic lime. "The efficacy of such a filter would speedily be lost."

Mr. Valentin says, "Lead can be no more removed from water than lime salts, without disturbing the composition of the water."

I mention these points, because we often are called upon to believe in the wonderful powers of newly patented filters, the truth being that none of them, except in a minor degree, exercise any other than a mechanical separation of particles in suspension. The old-fashioned Indian filter, when properly made and worked, is undoubtedly quite as efficacious as a more expensive apparatus coming to us under a grand and imposing name.

The only objection to the use of the filter of the country is, that the water which has been passed through it is liable to be polluted again before it is used.

This might easily be remedied by constructing the earthenware receptacle of a different shape, closing it at the top, and fitting it with a stop-cock below, so that the purified water should be secured from being soiled by dust, dirty hands, or utensils.

With the most perfect filtration, it must be borne in mind that organic substances in a state of solution are not entirely removed from water. Those which are mechanically suspended are no doubt left behind in the filter, but there is no evidence to show that the best filtered water may not contain noxious

*Journal of Social Science, 1866, page 288.

organic matter enough under certain circumstances to produce disease. Every one may easily satisfy himself that filtration does not separate all the organic or oxydizable matter in water. Let a specimen of filtered water be set aside in a clean bottle for a few days, covered so as to exclude extraneous matters. It will gradually become putrid in proportion to the amount of dissolved organic impurity present. At the same time let a similar specimen of water, to which two or three drops of Condy's Solution have been added be observed. In the latter case the organic matter is gradually destroyed, the permanganate reduced, and the water remains sweet, inodorous, and in a state perfectly fitted for domestic use.

Mr. Condy asserts that the fluid sold by him under the name of "Disinfecting fluid," and which consists mainly of a solution of the permanganates of potash and soda, may be safely and efficaciously mixed with drinking water, in quantity sufficient to effect the destruction of organic matter, without communicating any nauseous taste, or chemically objectionable ingredient to the water. This statement is not only fully borne out by my own observations, but is supported by the more valuable testimony of Professor Hofmann.* This gentleman observes that he has had many opportunities of satisfying himself of the efficacy of the permanganates as disinfectants. "Waters taken from stagnant ponds, highly charged with organic matters in a state of most active putrefaction, and emitting the most repulsive odour, were instantly deodorized by a comparatively small quantity of permanganate, or even of manganate of potassium or sodium. By careful manipulation, the operator may completely free water from organic impurity, introducing into it in exchange, only a minute quantity of an alkaline carbonate. This is rarely an objectionable, frequently rather a serviceable addition, especially in the case of hard waters, which are thus softened."

The quantity of the disinfecting fluid required to neutralize the noxious properties of organic matter in water, depends entirely upon the proportion of "oxidizable" organic impurity present. The permanganates have for some time been used by Chemists as tests for organic impurities in air or water. Condy's Solution when mixed in minute quantity with pure

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*Report by the Juries of the International Exhibition, 1862, Class II, Section A. Chemical Products and Processes, page 108.

distilled water, gives a beautifully pink fluid, the colour of which remains unchanged so long as the atmospheric air is excluded, or contact with organic matter avoided. The rapid decolorizing action of organic matter upon such a solution has been taken advantage of by Chemists, to determine relatively the impurities present in air or water. The permanganate of potash or "chameleon" test does not show, in a perfectly reliable manner, the actual amount of organic matter present in a specimen of water, but it has been used by Drs. Allan Miller and Angus Smith, chiefly to indicate the amount of oxygen which the water requires for its purification. For all practical purposes, however, it may be said that a water to which "chameleon" has been added in quantity sufficient to communicate a faint pinkish tinge, and which color gradually fades away and disappears after twenty-four hours, is, to all intents and purposes, sufficiently purified of organic matter to become potable. This quantity may vary according to the foulness or purity of the water, from twenty or thirty drops of the concentrated purple fluid to one or two drops per gallon.

Specimens of drinking water used by the European troops in Fort St. George will decolorize in the proportion of six and eight drops of Condy's fluid per gallon. It takes several days, however, to completely discharge the color from a solution in the proportion of eight drops to the gallon. As it is the readily oxidizable matter in water which is really injurious, it will I have no doubt, be sufficient to add to drinking water merely a sufficient quantity of the permanganate to maintain a faint pink tinge for the space of a quarter or half an hour. Dr. Angus Smith,* in a pamphlet lately published, has remarked upon the slow decomposition of a portion of the organic matter as follows:—

"The organic matter which decomposes the "chameleon" in a minute or two must be carefully noted, but generally there is a greater quantity which decomposes very slowly, the results obtained for the latter is, I believe, of less value. Generally considerable permanency is obtained in ten or fifteen minutes, then the slow decomposition begins of quite another quality of organic matter, requiring hours or even days. The amount decomposed instantly is a true measure of the putridity, it is believed."

* Examination of organic matter in water, with reference especially to Sanitary purposes.—(Pamphlet.) By Angus Smith, M.D.

Dr. Miller is of opinion that any instantaneous change in color is due to the presence of nitrites in the water, and that the instantaneous bleaching caused by the nitrites may be used in determining the amount of those salts. He maintains that the reducing effect occasioned by organic matter is always gradual. Dr. F. Macnamara,* Professor of Chemistry in Calcutta, who has lately reviewed this question, declares that Dr. Angus Smith's observation is the more correct, and that he has examined water which decomposed instantly a large quantity of 'chameleon,' though perfectly free from nitrites or other reducing agents than organic matter."

My own observations here in Madras entirely confirm those of Drs. Angus Smith and F. Macnamara.

The water of the "Seven Wells," samples from each of which have been recently analyzed by Professors Mayer and Wyndowe, is declared to be entirely free of nitrates or nitrites, and yet it effects an instantaneous reduction of a considerable quantity of chameleon. The complete effect, however, is not obtained with this water until it has stood for three or four days.

The organic matter in the several wells which supply the drinking water to the inhabitants of Fort St. George varies from four to nearly eight grains per gallon. In the specimens I have examined, the organic matter is apparently completely destroyed by the addition of Condy's fluid in the proportion of eight drops per gallon. The water so treated, upwards of a month ago, is still perfectly fresh, sweet, clear, and inodorous. The peroxide of manganese remains at the bottom of the vessel in the form of a brown flocculent precipitate, and although the specimens are standing in a room where the thermometer has averaged 90° Fah., so far as I can see, they seem likely to keep in the same wholesome condition for months or years, if permitted to remain undisturbed.

Another specimen of drinking water examined required only four drops of Condy's fluid to the gallon to free it completely of organic matter.

A further specimen from a well of noted purity requires even less than this.

The Medical officers of health for London in their "Memorandum of a plan of united action in the case of an epide-

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* Indian Medical Gazette, page 97.

mic of cholera," give the following formula for the purification of drinking water. "Add *one drop of Condy's disinfectant to a gallon of water;* stir it well and leave it for twenty-four hours to settle."* From what has been said it is evident that the question of *one* drop or of *ten* to the gallon must be a matter of consideration as regards each individual specimen of water. With a tolerably pure water one drop to the gallon might be quite sufficient, but when the organic impurity is in excess—as in the majority of well waters in the town of Madras—a larger quantity is needed. If, on the addition of the fluid, in the proportion of two or three drops to the gallon, the color is rapidly discharged, it is an evidence of the presence of organic impurity in considerable quantity. In each instance the correct porportion of fluid must be ascertained by actual experiment. This done, however, there is no reason why Mr. Condy's patent fluid or any other preparation of the alkaline permanganates, should not be brought into general use in the purification of water in India, and especially during those seasons when epidemic cholera is rife.

There can be no question but that the permanganate solution is completely effectual in the destruction of organic matter, dead or living. The immediate discoloration of the solution is, I suspect due, not to the presence of nitrites as supposed by Dr. Allan Miller, for it occurs in waters which contain no trace of such compounds, but to the oxidation of dissolved organic matter that is about to take on new forms, and the slower process of discoloration which follows, is probably explainable under the supposition that another portion of organized matter is possessed of sufficient vitality to resist for a time the influence of the oxidizing agent.

All physiologists and chemists are agreed that it is the presence of organic matter in water in its putrescent form that renders it, even in minute quantity, so objectionable for drinking purposes.

A water may contain a high proportion of organic matter, and yet be not only drunk with impunity but be perfectly wholesome. But the explanation in such a case is probably to be found in the fact that the organic particles, animal and vegetable, are alive, and not in a con-

* Social Science Journal, March 1866.

dition to become readily putrescent. The presence of chlorides in excess, would appear to exercise some influence upon organic matter, retarding or preventing its decomposition. I imagine that this is the case in regard to the well waters in Madras which, being chiefly drawn from below the sea level, abound in chlorides. The water used by the troops and shipping, although largely impregnated with organic matter, does not putrefy so readily as some other waters in which the proportion of organic matter is less. It is to this day a favorite water with Ship Captains, on account of its keeping so well upon the homeward voyage. If the presence of chlorides in more than average quantity does not exercise some influence upon the organic matter, I shall be glad if some of our chemists will be good enough to let us know what is the true explanation of the fact I have noticed.

It seems to me, and I say it with all respect and deference to the opinions of many eminent men, who have traced a connection between water impurity and disease, that in the present state of our knowledge, we are not justified in condemning a water, because upon chemical analysis it is shown to contain a larger proportion of organic matter than what is theoretically considered safe. Dr. Angus Smith has put this very clearly in his pamphlet, he says "the mere existence of organic matter is no proof of impurity. * * We must know the quality as well as the quantity. If the matter is peaty, consisting of the ordinary humous class of acids and salts, the colour may be very dark, and the water very unpleasant to look at, without being in any way, so far as I have ever heard, injurious to health."

A water that begins to be putrid, shortly after it is drawn from a well, must always be considered a dangerous water for drinking. The putrefactive process, however, is most rapid when the temperature is high. A mountainous jungle stream at a temperature of 65° may contain more organic impurity than the water of the plains, and yet bear the test of "keeping" better than the latter at a temperature of 90°. The effects of elevation and temperature must always be considered in judging of a water by the rough and ready method of standing it aside for a time.

But there is a much more important test of the quality of drinking waters than any the chemist or the sanitarian can give us, and the test I allude to is a physiological one. It

seems to me in these days, when every man thinks himself more or less qualified to comprehend the truths of Sanitary Science, that there is a great danger of overlooking the obvious fact, that the best proof of the wholesomeness of a water must be the general condition of health of the people who drink it.

The Madras Fort water supply has recently been condemned, on what appears to be doubtful evidence of its unfitness. A Committee in reporting to Government on the subject made the following statement:—

"The waters of all the wells within the compound of the so called seven-wells (real number ten) are unfit for internal use." * * *

"The total impurities contained in these waters vary from 23·10 grains to 70·10 grains in the gallon, while those of an organic nature vary from grains 3·90 to grains 7·85 in the gallon."

"Taking into consideration the fact that in the salubrious climate of England, no waters are considered even passable for internal use, which contain a greater quantity of organic impurities than two grains in the gallon; the Committee has no hesitation in pronouncing its verdict of unfitness."

It might have been supposed that before condemning a water which has supplied the troops and shipping of Madras for very many years, that some enquiry would have been made as to the prevalence or absence of diseases usually traceable to bad water, but so far as the report of the Committee shows, the sole reason for reporting upon the unfitness of the water for internal use, was the questionable hypothesis that "no water containing more than two grains per gallon of organic matter" is "even passable!"

The records of the Medical Department of the Madras Army, so far as I am acquainted with them, do not bear out the idea that the Fort water, highly impure as it is according to our notions of the present day, has ever been productive of disease. On several occasions I have known epidemic cholera to rage in the neighbouring town and bazaars with extreme virulence, and the European troops, drinking the much-abused "Seven Wells" water to maintain an absolute immunity therefrom. Cholera has prevailed in the Fort on two occasions within the last ten years, but in both instances it was introduced by the arrival of troops from infected localities.

Diarrhœa and dysentery do not specially prevail amongst

the troops or other residents in the Fort. The only class of affections which predominate in Madras above the average of other military stations, are those of venereal origin. The most "advanced" sanitarians can scarcely be prepared to state that these affections result from the use of impure water. The physiological test, in point of fact, affords literally no evidence in support of the view, that a few grains of common salt and a rather high proportion of organic matter, are injurious to the health of those who drink the water.

This brings me back to the point which I desire especially to notice, with reference to water supply, namely, that in learning all that we can of the chemical composition of a water, its physiological properties should at the same time be carefully noted. I am aware of an instance of a by no means impure water—so far as chemistry sheds any light upon it—being the source of guinea worm, in those who use it. Chemical analysis in such cases affords no useful information. The physiological test and the knowledge which it conveys is our only safeguard. The natives of India, according to my experience of them, are not bad judges of the wholesomeness of a water. They recognize the fact that certain waters produce sickness, and that others are destitute of injurious properties. As a rule they prefer well waters, or the water of deep tanks in which oxygen yielding plants abound, and avoid resorting to flowing streams.

There can be no doubt that the percolation of water through soil deprives it, in a great measure, of organic impurities suspended or dissolved, and that on this account well water in India is more to be depended upon for wholesomeness than that of rivers or canals. Open tanks are always liable to surface pollution, though they have otherwise some advantages in exposure to sunlight, and contact with a large and constantly changing surface of atmospheric oxygen. The safest plan in a strange district is to drink the water that the inhabitants recommend. The physiological test generally enables them to chose safely, and it is more than doubtful whether the most careful chemical analysis of a water would lead them practically to do any better.

It cannot, however, be gainsayed that if it is possible to subject drinking water to some simple process, whereby it becomes deprived of all organic impurities, and receives no objec-

tionable ingredient in return, every effort should be made to secure this desirable object, and especially in times and seasons, when water impurity may be a suspected source of disease. Mr. Condy's fluid appears to me to hold out a reasonable prospect of our being able to ensure absolute purity of drinking water, so far as organic matter is concerned.

For barracks and hospitals the permanganate solution should be added to the water in the required proportion, and the mixture kept in a reservoir for a few days, when it should be drawn through a filter to separate the peroxide of manganese. For ship board use, from a tea spoonful to half a wine glassful of the fluid to each hogshead, would preserve the water sweet and pure throughout the longest voyage. Travellers in India, by carrying about with them a small phial of Condy's fluid, may always ensure water that is safe to use. An addition of four or five drops of the fluid to a gallon of water, in most cases, will be sufficient to destroy any immediately injurious organic impurity in the water. Water so purified may be drawn through a syphon pocket filter, and, if necessary, any quantity not immediately wanted for use may be preserved in corked bottles. The trouble and expense of purifying a sufficient quantity of water for drinking purposes by this method is so insignificant, that no European resident in India need complain of the difficulty of securing a wholesome potable water. In private houses the ordinary chatty filter of sand and charcoal may be used for separating the deposit of peroxide of manganese from the purified water.

ART. VI.—*Report upon the epidemic of Bilious Relapsing Fever in Bangalore in* 1865. *Its Etiology, Nature, Course, Pathology and Treatment, with Observations and Cases.* By THOS. LOWE, Esq., Brevet Surgeon, Madras Sappers and Miners.

Etiology.—Prior to the manifestation of this fever in Bangalore in its epidemic form, which commenced so far back as April 1865, there had been several cases of cholera, hooping cough, small-pox and chicken pox, acute parotitis and aphthæ, all accompanied by low fever, amongst the Sappers and Miners.

Many of the cases of small-pox, parotitis, aphthæ and cholera were contemporaneous with the cases of adynamic bilious relapsing fever under consideration.

That the presence of these zymotic diseases in a station like Bangalore, which has hitherto enjoyed an enviable reputation for salubrity, is owing to *local* causes, will, I believe, be made apparent.

It is true, so far as the Sappers and Miners were concerned, that the attacks of cholera which preceded and accompanied this fever were sporadic only, nevertheless they *were* cholera of a severe type, and this is sufficient to show that influences of a malignant nature have existed for some time past in this station. The same remark applies for the solitary fatal case of diphtheria and the allied diseases above named.* Of the local causes, the following appear to me sufficient to account for the presence of these diseases; ill-arranged and badly kept dwellings, bad water, bad air, and peculiar atmospheric states.

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* I am informed by Deputy Inspector General of Hospitals W. Mackenzie, C.B., A.M., and M.D., that one case of diphtheria occurred in 1864.

Houses.—In the *lower* and *lowest* levels of the city, the streets and houses exist without arrangement or consideration of the prevailing winds; many houses, huts and hovels in these sites are toppling upon one another, void of ventilation or possibility of ventilation. Around these ill-arranged dwellings there exists a greater or less accumulation of filth and noisome effluvia, from the inevitable results of the constant application of damp, heat, and decomposition, the emanations from these sources being carried by the prevailing monsoon along the valleys, especially along the one in which the *great drain* runs, which, again, forms a pregnant focus of zymotic poisoning.

Water.—The principal chain of tanks which collect the surface-water lies in the main drain valley; the principal wells also are sunk in this valley; and from these tanks and wells the inhabitants obtain their chief supply of water. The last great source being the *Ulsoor* tank, a large sheet of water with shelving banks covered with rank vegetation, —stagnant water along the margins of which deadly combinations are incessantly forming.

In the majority of the tanks of Bangalore the natives wash their bodies and clothing, horses water in them, and pollution daily occurs in this water, carried hence for drinking and cooking purposes. A few feet from two large wells are *two old burial grounds.* Around most of the wells there exists a constant puddle, which at times becomes very offensive. The whole of the tank water in Bangalore is essentially *marsh*-water; the edges of these tanks are extensive foci of miasms, and water is a great absorbent of malaria.

I have examined carefully, by microscope, the water of many wells and that of the tanks, and I found all of it more or less impregnated with organic matter,—algæ and infusoria, —and in some instances so crowded with animal life, that the bare eye was sufficient to distinguish myriads. The water from the various tanks was the worst, and quite unfit for human consumption.

Air.—But that it does not depend upon the water *only,* I may mention that one of the severest of these attacks occurred in the house of an officer wherein scrupulous care is taken with the water. The house in which this case occurred is

close to the miasmatous border of the Ulsoor tank, and was subjected to a continuous nuisance from the ordure pits of a neighbour's establishment.

A second case which proved fatal, occurred in the family of the Serjeant Major of the corps, whose house is also subjected to malarious influences.

Atmospheric Influences.—The heat which prevailed from the month of February to the month of June, accompanied by a highly electric condition of the air, followed by heavy dews and cold nights, were, in my opinion, great *exciting causes* of this fever.* Such meteorological agencies are sufficient to give great impetus to vegeto-animal exhalations which exist here in abundance, while it is well known they induce an indescribable *malaise* in the system. The dry heat carries the water away from the lungs too rapidly, while the electricity of the air reduces the nervous force, leaving a feeling as though the body had been beaten all over and an attack of fever were incubating; such were my own feelings, and the same was experienced by others.

I find it customary amongst the poorer classes to store their ordure and household filth in a small pit hard by their doors, until they have accumulated a sufficiency for sale to the cultivators: this store remains open for months before it is disposed of, when a fresh process of stirring is commenced, so that a source of atmospheric pollution is *ever* present.

Now, considering the quantity of animal and vegetable refuse daily accumulating in a large city and exposed to a tropical sun, the stagnant state of the water in these half-dried up tanks, the bad condition of most of the public well-water, the peculiar electric state of the air during the season of heat, I think we need be at no loss to account for the generation of zymotic elements of disease and the special *typhoid* character assumed.

A grave error, in my humble opinion, has been committed

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* In no part of India, save in Central India, do I remember such a highly electric condition of the air.

in selecting encampments on the lower level of the great valley, and in permitting ill-arranged crowded bazaars, huts, and hovels, to be established around and close to these military sites; and I fear unless a better source of water-supply and a more efficient regulation for deporting filth be instituted than now exists, Bangalore will, ere long, lose the good reputation it has hitherto been famous for as a station for European troops.

Nature of the Epidemic.—I have pointed out the sources of malaria in Bangalore. Before I had made the nature of this epidemic a subject of investigation and study, I was inclined to look upon it as a severe form of bilious remittent fever, resembling *yellow* fever, and it continued to present many of the features of this fever, but a closer attention to every case convinced me that it was not simply an epidemic of the common bilious remittent fever, although nearly allied to it. There can be no doubt these fevers, the products of malaria, have many features in common, so that it often becomes a matter of difficulty to define exactly the nature of a fever.

I believe they all originate in the *same* morbific agents, they certainly possess features of *relationship* that are very striking, and this will be appreciated by referring to the differential characters of remittent fever, malarious yellow fever, relapsing or recurrent fever, cholera biliosa and cholera asphyxia. Experience shows us how closely severe attacks of these diseases simulate each other, and renders it doubtful that they are not all the offspring of one and the same cause applied in a more or less concentrated form to bodies which have been acted on by more or less solar-electric and other debilitating atmospheric and terrene influences.

I believe they are, and that persons predisposed by one or several of these conditions before enumerated are but little able to withstand the morbific influences by which they are surrounded, while others better circumstanced and of more vigorous constitution pass through these influences unaffected by them, or suffer only in a slight degree. In order to demonstrate the family relationship of these diseases, I have drawn up the accompanying short but leading description, which I think will tend in some measure to show that what I have adduced is not without some foundation.

Table shewing the characters and relationship of Malarious Yellow Fever, Remittent Fever, (Jungle Fever,) Recurrent or Relapsing Fever, and Cholera.

Malarious Yellow Fever, Bilious Remittent Fever.	Remittent Fever, Jungle Fever.	Recurrent or Relapsing Fever.	Cholera Biliosa. Cholera Asphyxia.
Malarious influences. Fever ardent, continued, —remission only; intense headach; precordial oppression, violent action of heart. Epigastric and hepatic pain and tenderness. Yellow eyes and skin, tongue and mouth; stupor; constant vomiting of bilious matter, some times black; constipation or purging, urine high colored, loaded with bile, not albuminous. Delirium, lethargy, coma and epistaxis and hæmorrhage from bowels; relapse not common; visceral complications; liver generally affected; sometimes critical perspiration; spleen sometimes affected. Convalescence not usually prolonged.	Malarious influence. Fever more or less severe; headache; tongue furred, yellow; daily paroxysms, and remissions of fever; sleeplessness, delirium; hepatic pain and dullness; vomiting, bilious or bloody fluids; urine high colored, not albuminous; symptoms asthenic or sthenic; wild or low delirium; prostration; coma; jaundice; odour of dead body; critical perspiration; full remission and amendment, or great prostration and slow recovery; no tendency to relapse; convalescence not prolonged; spleen mostly affected; sometimes nervous system; no special crisis.	Malarious influence. Fever severe, headache, prostration, frequent syncope. Tongue, yellow or black; constant vomiting—vomit, bile, mucus and blood; precordial oppression; violent action of the heart; great pain in the limbs; watchfulness, anxiety; stupor; delirium; coma; remission short, or absent for days, *repeated colapse, critical perspiration* and remission from 5th to 9th day, generally on the 7th; no fever for days, then *sudden relapse,* on the 12th, 14th or 16th day from first attack. Symptoms altogether more violent for days; remission again; odour of dead body; petechiæ; death apt to occur in syncope or collapse; slow convalescence; *liver* and *spleen* affected, or bowels; death may occur in a few hours from attack.	Malarial influence. Premonitory symptoms insidious. *Feverishness,* Malaise, Diarrhœa; chilliness of skin; copious fetid stools but excrementitious; then anxiety; syncope; collapse; vomiting; cold skin; burning over solar plexus; urine *now* suppressed; vomit like rice water. Then *spinal* symptoms, viz., spasms of voluntary muscles haggard or corpse like face; cold sweat; precordial oppression; burning heat of body, but cold skin; hiccup, semi-coma or clear mind; coma; death in a few hours or days. Sometimes sudden seizure, collapse, repeated syncope, cold sweats, no pulse, *no spasms, no vomiting,* corpse-like face, lies down, and dies. *Reaction* may ensue, then pains in body, weariness and sleeplessness follow; tongue yellow or black; burning heat or algide state; urine not now albuminous; hiccup; jaundice and gastric irritability. Fever marked by remissions and exacerbations, but typhoid; relapse apt to occur; fever becomes quotidian, then tertian or quartan; slow convalescence.

That the form of fever under consideration, and attacks closely allied to it, in isolated cases, are met with in India, cannot be doubted. In its *epidemic* form, presenting its *typhoid relapsing* features, it appears identical with the remittent epidemic of Burdwan and Nuddea in Bengal in 1863, and the famine fever of Great Britain of 1847-1848, and I believe it to be only a less aggravated effect of the same febrific miasm, which, when evolved from the earth or atmosphere in a more concentrated and active state, produces the disease we call cholera.

This fever presented numerous features which were essentially *typhoid*, and it ravaged that very class of people who were hard worked, ill fed, ill clad, and badly housed—the grass cutters and other poor. The year of 1864 and 1865, counting from October to October, was a very remarkable one in both hemispheres for atmospheric perturbation; these affected the crops, and provisions have risen in price, while the wages of the labourer have not risen equally. The poor, consequently, have obtained a reduced quantity, and an inferior quality of food; and I have ascertained that very many have only been able to obtain *one* meal of *animal* food, which then consisted of offal, once in eight or ten days. They are badly off for clothing; their huts are in decay and afford them insufficient shelter. Thus have been added to the morbific agents heretofore in existence, two patent elements as *predisposing* causes of disease—insufficient shelter and destitution.

Notwithstanding that this fever presented many features of yellow fever, and the common bilious remittent fever, its characteristic feature was its *relapsing* nature, hence I have designated it as an epidemic of *bilious relapsing fever.*

Course or symptoms of an attack.—This fever was often preceded by premonitory symptoms, but in some cases the attack was very sudden. The premonitory symptoms were langour, loss of appetite, general pains over the body, headache, flushed face and nausea. Immediately preceding an attack, the skin grew cold, a chilliness crept down the spine, over the loins and down the thighs; the heart and arteries beat violently, and the countenance became suffused and drunken-looking, this was followed by extreme exhaustion; the patient staggered as though under the influence of a poison; the eyes were suffused and swimming; he answered questions in an irritable manner, now and then appearing to

wake up when addressed, and as he replied he sometimes staggered and fell to the ground in syncope; his breathing was distressed and laboured, he complained of nausea, precordial oppression and pain; the skin was generally burning hot, dry, and harsh; the pulse quick and bounding, and weak, rarely below 100 beats, and oftener ranging from 100 to 140 beats per minute.

There was almost invariable epigastric and hypochondriac tenderness and fulness, frequent bilious vomiting, furred tongue, bitter taste in the mouth, constipation, and high-coloured and scanty urine.

As the paroxysm advanced, respiration became more painful and laborious; the tongue became dry, yellow and wrinkled; there was intense thirst and headache; violent action of the heart and carotid arteries, increased gastric irritability; constant vomiting and inability to swallow; hallucinations of the imagination or muttering delirium; at length the patient sank into severe collapse, became semi-comatose and passed large offensive watery evacuations involuntarily in his bed; at other times the patient sank into *repeated syncope while lying in bed.*

The patient might remain in this condition 24, 36, or 48 hours with no signs of remission, at other times, some 10 or 14 hours after the attack, a profuse perspiration would break out, the pulse would fall to 100 or 96 beats per minute, and the patient would be listless and exhausted. The remission varied, sometimes it was short, at other times it lasted an hour or two, when another paroxysm more violent than the preceding would follow.

In some cases the extreme nervous prostration and collapse set in from the beginning, then the skin was cold and clammy, the face haggard or corpse-like, the voice almost gone, the pulse small, fluttering, the lips, tongue and teeth covered with black sordes, hepatic enlargement was extreme, there was *complete suppression of urine*, low muttering delirium ensued, and offensive evacuations escaped involuntarily, while an odour as of a dead body surrounded the patient. In fact such cases appeared for the time as cholera.

From the 1st to the 7th day the patient suffered severely, at one time cerebral and nervous derangement being most marked, at another, gastric, hepatic and enteric symptoms prevailed.

In the majority of the cases, constant nausea continued day and night, the vomit was invariably green bile, sometimes blood, sometimes like coffee-grounds; as a rule there was extreme and painful watchfulness, and entire absence of sleep day or night. The exacerbations generally took place in the forenoon, the remission about 3 A. M. Sometimes the exacerbations ensued at sunset and continued through the night, the remission then occurring about midday.

In one case there was neither exacerbation nor remission—low typhoid symptoms set in from the first, and coma continued for 9 hours.

About the 7th, 8th, or 10th day the patient began to mend, and this was preceded by a most *profuse critical perspiration;* sleep would not return unless induced by narcotics, and in some cases two and *three* grain doses of morphia failed to produce more than a dreamy calm.

Some of the patients suffered much from dysentery as a secondary affection; some from sub-acute peritonitis, the *peritoneal covering of the liver* appearing much implicated; tympanitis was also a distressing complication in several cases. In almost all of the cases there was marked *yellow suffusion* in the skin, and the tongue, gums, and mucous lining of the mouth was as yellow as though the patient had been masticating saffron. The evacuations were at first very offensive, grumous, tarry, or greenish, then as deeply tinged with bile as if Bichromate of Potash had been mixed up with them; on one occasion the patient passed a fetid mass like *fresh green lichen* gathered from the sides of a well.

In several cases collapse was as extreme as in Cholera in its worst form. In one case, the wife of an officer, *petechæ covered the arms, chest and neck,* while the lips and teeth were covered with black sordes.

At first the urine was generally scanty, hot, and high coloured, of a high specific gravity, and not albuminous; then it became very copious, muddy, *loaded with bile* and highly offensive, while the most painful *dysuria* I have ever witnessed accompanied and preceded its expulsion.

In three instances the inflammation within the liver ran rapidly into suppuration, the abscess being discharged in one case through the lungs, and in two others through the bowels.

In two severe cases, there was an odour as of a dead body surrounding the patient at the crisis.

In several cases the spleen became painful and enlarged and soft; in one case there was severe epistaxis, and in another arrested uterine function, and severe ovarian complication.

In all the cases, emaciation has been rapid and extreme; recovery has been very slow; more or less organic mischief has remained in the liver, which has rendered the progress of several of the cases tedious, doubtful, and difficult.

THE CRISIS.—This occurred on the 5th, 7th, 8th or 10th day—generally on the 7th,—and was followed by a total remission of all the symptoms. This critical perspiration was so profuse and exhausting that the patient often appeared as though he had been largely bled. In one case epistaxis immediately preceded the crisis; in another severe passive hæmorrhage from the bowels; in a third passive hæmorrhage from the bowels and dysentery. After the crisis, the pulse ran down to its natural standard or below this, the tongue began to clean, the face lost its haggard look, and the patient *might* obtain some sleep at night, which, however, was the exception.

The patient would then remain in this weakened state for four or five days; when on or about the 14th day from the commencement the patient would have a sudden *relapse* in a severer form than the first. In some cases the relapse was but a febrile exacerbation continuing from 24 to 36 hours, in others the relapse would continue for four or five days, sometimes longer. In some instances the relapse was ushered in by a sudden appearance of jaundice. When the fever was again subdued, and the second critical perspiration ensued, sudden collapse of a most formidable nature came on, and in two instances carried off my patients. I may summarize the symptoms of this terrible fever, as instanced by me in some fifty cases, as follows.

A feeling of debility, restlessness, inquietude, followed by shivering and cold along the spine, around the loins and down the thighs; giddiness and weight in the head and eyes, flushed face, suffused eyes, and countenance *drunken*; tightness across the chest, laboured breathing, nausea, thirst; tongue, first covered with a creamy or yellowish fur, mouth bitter; heart in violent action, carotids beating violently; skin burning hot; urine scanty; constipation. Then great pains all over the body, epigastrium very tender, nausea, constant vomiting of bile, sometimes blood; adynæmia,

anxiety, severe and repeated collapse, tongue brown, rough, thirst unquenchable; profuse and exhausting perspiration, followed again and again by burning skin;—relapse.

About the 3rd or 4th day eyes more suffused, pupils wide, conjunctiva, face and body of a deep yellow colour; patient became stupid, semi-comatose; tongue black in centre, red, cracked and inflamed at the edges, dry and shrivelled; constant nausea and vomiting; fluttering action of the heart; repeated collapse; corpse-like countenance; petechiæ over body; dyspnœa and precordial oppression alarmingly aggravated; acute gastric and hepatic pain complained of; face became pinched, the eyes sunken, hollow and fixed; the voice inaudible; the hands, cold and dank; sordes covered the lips and teeth; pulse became fleeting and intermittent; frequent sighing and yawning; repeated collapse; gritty, tarry, bloody, offensive stools were passed, and an odour of death prevailed; the sense of sight and hearing were morbidly acute, and the mind usually clear; up to this stage great emaciation had occurred; then succeeded to this terrible train of events, pains of a severe kind in the calves of the legs and soles of the feet; continued tremors and subsultus tendinum in the weak and emaciated limbs; constant strangury; distressing tormina, tenesmus, and dysentery; epistaxis; distorted and bloated features; contracted pupils; alarming sweats, muttering delirium, coldness of the extremities, fleeting intermittent pulse; coma, convulsions, death.

Favorable symptoms.—Moderate nausea and vomiting not increased. In second stage of the fever, slight yellow suffusion; stools containing liquid bilious matters; long remission; cleansing of the tongue; nervous system only slightly deranged; no relapse; heat of body not exceeding 102° Faht.

Unfavorable symptoms.—Great prostration; repeated collapse; intermittent pulse, above 100; vomiting of bile; hepatic complication; passive hæmorrhage from the bowels; strangury; involuntary escape of fæces; odour of corpse; delirium and coma; heat of body exceeding 102° Faht.

Average duration of the Fever.—In a simple uncomplicated form, unattended by more than one relapse of febrile exacerbation after complete remission, the duration of the fever, on an average, has been 9 days; in attacks in which visceral complications existed in weakly subjects and severe relapses, the average duration of the fever has been 20 days;

the nature of the convalescence has been in direct ratio to the nature of the attack and the complication it caused, but the convalescence has been very *slow* in all. I had one patient confined to bed over *twelve weeks*, who is still suffering from debility and the visceral disease induced.

Pathology.—In the attacks of this fever a period of latency was generally to be observed or traced, in which the poison has been exerting its influence on the system; sometimes this period was very short; at others it could be estimated at several days. This, I think, depended upon the inherent powers of resistance much more than on the general condition of health.

Some persons are more tolerant of toxic influences than others, their powers of resistance and accommodation are great, hence they may continue to reside for years in an unwholesome atmosphere in apparent health and unimpaired vigour, while their less vigorous neighbours are cut off.

The introduction of zymotic poisons terminates in some instances in nothing more than functional derangement; but in others they seem to display an electric affinity for special organs and tissues.

I believe the poison causing this bilious relapsing fever and its allied diseases, acts in general as a powerful paralyser on the nervous centres, through a deranged condition of the blood, and that passive or active hyperæmia of the cerebro-spinal and ganglionic system is the secondary pathological effect. The thoracic and abdominal visceral complications being the consequence of this hyperæmic condition within the nervous centres and ganglia.

I believe that the special type of fever manifested will depend upon the powers of resistance within special viscera and the potency of the toxic agent applied; certain modifications arising from the special electric and terrene influences present at the time—the adynamic, algide, or typhoid symptoms coincident being the measure of the toxic influence upon the blood and the derangement set up by it within the cerebro-spinal and ganglionic system.

At one time bilious symptoms preponderate, at another the poison appears to have elected the spleen; at another to have well nigh paralysed the whole nervous system,—especially the nerve centres of organic life, when visceral engorgements ensue, and enteric symptoms prevail, as diarrhœa,

dysentery, passive hæmorrhages, and ascites. In several instances in this epidemic the gastric symptoms were so severe as to leave no doubt of morbid changes taking place in the mucous membrane of the stomach and duodenum; and, again, the accession of dysentery left no doubt of a similar condition existing in the colon and rectum. Indeed, the severe and continued prostration, the expulsion of grumous fetid matters, tympanitis, and great abdominal tenderness, were sufficient to shew that excessive congestion had proceeded to exhausting exudation from the intestinal capillaries; constipation, then diarrhœa, and passive hæmorrhage from the bowels are frequent marked effects of derangement of the cerebro-spinal and ganglionic systems.

The relative frequency of the secondary affections in this fever may be thus stated—(1) hepatic disorder, (2) jaundice, (3) dysentery, (4) splenic disorder, (5) peritonitis : hepatic affection being the most frequent, coupled with grave typhoid (nervous) condition of the system.

In my own charge there is a body of men existing the same, as to drill and engineering works, clothing, meat and drink, and exposed to exactly the same causes of disease, of whom many are seized with this bilious relapsing fever, others with quotidian or tertian fever, some with small-pox, others with parotitis or aphthæ, others with cholera ;—and the conclusion I cannot help drawing is, that the *same* causes have originated and developed these various, but closely allied diseases.

I shall dwell further on this part of the subject hereafter, as I consider this an important position to assume and one that deserves far fuller treatment than I can possibly accord to it in a report of this nature.

Treatment.—I should not attempt to dilate upon the method of treatment adopted in this epidemic, had it been an ordinary routine practice, as fevers are generally dealt with now-a-days; but since I was compelled by the nature of the cases to pursue another line of procedure totally at variance with that which is inculcated in the most recent work on the practice of medicine,* I feel I ought to state fully what I have done, and my reason for departing so widely from the course laid down as a guide to the treat-

* Professor Aitkins's Scien. and Pract. of Med. Art. Remittent Fever.

ment of a fever epidemic in India and other tropical climates.

In the early stage of the disease, that is between the 1st and 4th day of the attack, the symptoms of anxiety, prostration, and oppression were such as might well deter one in adopting what are called depletory measures, and point to a reliance on antiperiodics and stimulants alone, or to the now-often practised plan of doing nothing.

But my experience proved that it was during this period, if at all, our measures should be employed boldly and decisively according to the urgency of the case, as indicated by the degree of nervous disorder, and gastric, hepatic, and enteric complications. This time was the most precious; in the last stage of the disease, when the patient was, as it were, in the "valley of the shadow of death," we became almost helpless spectators, merely ministering to symptoms as they arose.

Depletion.—As in almost every case under my care, more or less visceral disorder presented itself, I had recourse to *early local depletion;* leeches or the cupping glasses were placed over the gastric and hepatic regions, followed by blisters, and the depletion thus effected, notwithstanding the debility and prostration, was followed invariably by speedy relief of precordial oppression and dyspnœa, gastric pain and irritation, and of hepatic engorgement and pain; contemporaneous with this, the cerebral and cardiac disturbance was suppressed, the swimming in the head, and drunken expression of countenance vanished; to aid the depletion, the head was kept constantly wet with cold evaporating lotions, and the feet and legs warm with hot-bottles and blankets.

Purgatives.—With the view of unloading the intestinal canal and liver of their vitiated secretions, and of establishing an evacuation of the poison which the skin refused utterly, at this period, to eliminate, I administered a warm aloetic purgative draught, followed by a diaphoretic at midday. The effect thus far was frequently a degree of remission with a softening of the skin. Then I exhibited from five to ten grains of calomel with three to five grains of James' powder at bed-time, to be followed the next morning by the aloetic purgative draught; the invariable effect of this was a copious discharge of very offensive grumous stools of various colours, from tarry black to dirty green, and these evacuations left the patient much relieved. The

symptoms of collapse and typhoid condition were met at the *same time* by the frequent exhibition of beef-tea, and draughts of diffusible stumuli every hour, or oftener, as the symptoms required. The gastric irritation or inflammation was further allayed, after depletion, by the constant administration of alkaline draughts containing Prussic acid,) in from 5 to 10 drop doses), laudanum, chloroform, or creasote, and by the combined effects of *laudanum stupes* to the *nape of the neck* and pit of the stomach, sinapisms and hot turpentine foti to the abdomen; I sometimes found it necessary to restrain the gastric and enteric irritation by clysters containing from 1 to 2 drachms of laudanum. The dysuria and strangury were benefited by hyoscyamus and camphor suppositories.

Antiphlogistics thus used, locally and generally, I believe effect good by subduing a condition of congestion and irritation of the *great ganglia* induced and kept up by the original poison and metamorphic accumulation which the capillary system cannot eliminate. In totanus, induced by miasm, I have employed no other remedies than antiphlogistics with success.*

Quinine.—The experience of the late epidemic has confirmed an opinion I have long formed regarding quinine, viz., *that until some definite impression is made upon the system by means calculated to relieve visceral disorders (when these exist) quinine is of no value, but productive of harm.* I feel convinced I have on more than one occasion unwittingly converted a case of active hyperæmia of the liver, under similar conditions, into one of acute inflammation of this organ, *by the untimely exhibition of quinine.*

In this epidemic especially I have noticed a marked intolerance of quinine, the gastric irritability being so great that the patients positively expressed a repugnance to this drug, no matter in what form it was administered, they begged of me not to repeat the quinine, it "made them so ill." It certainly often produced vomiting to the great distress of the patient, when the stomach, up to the moment it was swallowed, had been in a state of quiescence. In cases wherein visceral derangement was not present, I found quinine well borne after the bowels have been well acted on, and bile was passing away freely. On the other hand, in severe cases in which

* Vide Madras Journal of Medical Science, vol. vi. Paper by the autho

typhoid symptoms prevailed and collapse was frequent, I found nothing but strong beef-tea, brandy, ether and ammonia sufficient. Quinine, even administered in enemata, failed to produce any amendment in the symptoms, and I feel convinced aggravated the enteric distress. In several cases I have not administered one grain of quinine until the perilous symptoms had abated ; and in many cases, even where the symptoms now appeared in no way to contra-indicate its employment, and the patient appeared to bid fair to convalescence, the administration of quinine was speedily followed by severe collapse, which again disappeared on the omission of the quinine, and the repetition of alkalis and stimuli.

After full remission I found quinine did *not* prevent a relapse. The long use of quinine before an attack (in several of the Wynaad cases already in hospital for intermittent fever) acted in no way as a prophylactic, and when administered during a remission, it neither prevented a recurrence of the paroxysms, nor did it modify them in degree.

When my patients, during a remission, were taking quinine and a relapse ensued, I omitted the quinine at once, returned to alteratives and alkalis, wine and brandy, and banished the foe. In this epidemic, quinine, in my hands, has neither proved prophylactic nor antiperiodic, but it has shewn that positive harm may attend its administration, unless the disease has been met and the current of events changed by other agents.

It appears to me that there exists between hepatic and enteric disorders in general—the results of malaria—and quinine, a peculiar antagonism which nullifies the specific action of this alkaloid upon the blood poison, while its presence induces *further* active visceral hyperæmia, and thus serves to reinduce and perpetuate the febrile condition.

I have been unwillingly obliged to abandon my faith in quinine, as the sheet-anchor whereon to rely in the treatment of malarial fevers, from the numerous stubborn facts which have forced themselves upon my observation from year to year.

I believe quinine interrupts secretion, and therefore elimination of the poison, and thus leads to further mischief in organs already engorged with blood and obstructed secretions ; and I am therefore particularly cautious now to assure myself that there is neither active hyperæmia nor a

tendency to inflammatory action within the abdominal viscera, before I venture to administer this powerful alkaloid. I shall refer to this more fully by and by.

Mercury.—Much has been written against the administration of mercury of late, and, if we are to believe some anti-mercurialists, not one grain of mercury should be given in this disease; that by giving mercury we are adding another poison (?) which will "act as a powerful ally of the first."*

I am not aware that there is any evidence that mercury administered judiciously is more a poison than antimony, opium, or prussic acid, nor can I understand how it will act as a "powerful ally" of malaria when used with caution.

Where this disease, or any other as Dr. Habershon has observed, has been blindly "smothered out by mercury," there the patient also would probably be extinguished, but might not the same event occur from any drug given in smothering doses?

It may have fallen to my lot to have witnessed cases in this epidemic peculiar for their great visceral derangement, it certainly has been my fortune to witness the uselessness of quinine and the beneficial action of emulgent or purgative doses of mercury, and the action thus set up to be the first step in the chain of events which have terminated in a cure.

The *specific*, as it is called, that is the *poisonous* action of mercury is *not* required; this would lead to further adynamia; but I am convinced its gentle emulgent action is one of great importance and good.

The sudden appearance of yellowness in the eyes and skin in weakly patients is an almost fatal sign, yet I have witnessed this pass away after the secretions of the abdominal viscera had been restored by moderate doses of mercury.

In this epidemic I relied much upon the emulgent action of mercury, combined with sudorifics for the subjugation of the paroxysms and restoration of the functions of the abdominal organs, for the following reason:—The disordered condition set up by the malarial poison is *further increased by the perpetual metamorphosis of tissue going on,* and thus a poison *from within* is hourly added to the *original* cause, the result being further determination and increasing congestion from

* Professor Maclean, in Aitken's Work.

arrested secretions and excretions, and total absence of elimination.

If mercury assists in the escape of these poisons, and restores secretions by its emulgent action on the viscera, as I believe it assuredly does, I do not see on what grounds it deserves to be classed as a poison and powerful ally of malaria. If it tended further to add to visceral congestion, if it tended to obstruct secretion by its stimulant action, and to constringe systems of vessels already loaded with vitiated blood and pent-up secretions, then I should consider it played the part of an "ally" of malaria; but until such therapeutic properties be demonstrated as the effects of mercury administered judiciously with a definite object in view, I submit it would be rash to exclude such a drug or to class it as a "poison," because some Physicians may have smothered out their patients by mercury.

I repeat, several of my late patients, owe their first improvement to mercury *alone*, that many of them have not taken one grain of quinine, and that in every case the gentle emulgent and sudorific action of mercury was of the greatest benefit, and lastly, that *not one relapse has occurred in those cases in which mercury was employed and quinine excluded entirely from the treatment.*

In conclusion, touching the treatment of this fever, not the least important in the management of the cases was the nursing, the liberal use of disinfectants, and a constant supply of fresh, cool, pure air.

Nothing less than constant attention, day and night, from the beginning to the termination of the attack sufficed; and I feel certain, several cases would have terminated fatally had not my Assistant Apothecary, Mr. Greene, and Dressers Doorgiah and Parthasarathy devoted unwearying attention to these patients. They relieved each other in watching night after night, and to their kindness to my patients, and to the correct manner in which they carried out all my orders and instructions, I owe it that I record but *two* deaths. Both deaths were immediately caused by suppurative inflammation within the liver. In one case the abscess found its way into the lungs, and the patient died exhausted and suffocated; in the other case, the abscess was discharged through the bowels, and in this the patient died quietly in one of those collapses which so often occurred while the patient was lying in bed.

CASES.

The following abstract of a few cases I trust will suffice.

No. 1.

28th April 1865.—Admitted in typhoid state, chief symptoms those of acute hepatitis, jaundice, followed by coma, delirium, great emaciation.

Treatment.—Sinapism to abdomen, Mercury and James' powder, Mist. Alkali ℥i. 2ndis horis. Purgative enema, stimuli ad. lib., blister to back of neck, beef tea, when convalescing took quinine, taraxacum and gentian.

Discharged 8th June 1865.

No. 2.

17th May 1865.—Remittent fever, great dyspnœa, hepatic hyperæmia, anxiety; prostration, constipation.

Treatment.—Cupped over liver, blister, purgatives only.

Discharged 3rd June 1865.

No. 3.

8th June 1865.—Fever in typhoid state, liver greatly engorged, gall-bladder distended, tongue yellow; semi-comatose; pulse 128, weak; spleen tender; became jaundiced; constant nausea and vomiting.

Treatment.—Cupped over liver, hot foti, purgatives and diaphoretics, cupped over spleen, liver blistered. Took Nitro-Hydrochloric acid only.

Discharged 6th July 1865.

No. 4.

9th June 1865.—Remittent fever, typhoid, active congestion of liver; jaundice; dysentery.

Treatment.—Leeches to liver, Calomel and James' powder, diaphoretics; blister over liver, took Nitro-Hydrochloric acid and large doses of Ipecacuanha only.

Discharged 7th July 1865.

No. 5.

18th June 1865.—Low remittent fever, repeated collapse, became typhoid, excessive hyperæmia of liver, jaundice, constipation.

Treatment.—Aloetic purgatives, Grey powder with James' powder, alkalis, sinapism to abdomen, Nitro-Hydrochloric acid only.

Discharged 6th July 1865.

No. 6.

18th June 1865.—Admitted from the Wynaad, long subject to intermittent fever, for which he had been taking quinine for months past, took from this date a quinine mixture up to the 6th July, when he was seized in hospital with severe remittent relapsing fever, became typhoid, jaundiced; had excessive engorgement of the liver, suffered from repeated severe collapses.

Treatment.—Quinine *omitted*, blister over liver, Grey powder ter. die, aloetic purgatives and alkalis; cupped over liver; during collapses, beef tea, brandy, ether and ammonia, eventually returned to quinine.

Discharged 31st July 1865.

No. 7.

4th July 1865.—Remittent fever, became typhoid in 24 hours, liver greatly engorged, became jaundiced, repeated collapses, sleeplessness.

Treatment.—Leeches to liver, hot foti, Calomel, Jacobs' and Dovers' powder, alkalis.

13th.—Doing well, ordered quinine.

16th.—Relapse severe, *omit* quinine; Calomel, James' and Dovers' powder, alkalis, turpentine stupes to abdomen; stimuli, hepatic functions being restored, he returned to quinine and wine on the 18th.

Discharged 24th August 1865.

No. 8.

15th July 1865.—In hospital under treatment for fever from the Wynaad, to-day became suddenly typhoid, repeated collapse, jaundice, great hepatic congestion, continued thus for five days.

Treatment.—*Had been taking quinine* for a month, omitted now, ordered alkalis and stimuli; Calomel and opium alkalis, and eventually quinine again.

Discharged 4th August 1865.

No. 9.

20th July 1865.—In remittent fever, typhoid, repeated collapse, constant vomiting, tongue black.

Vespere.—In articulo mortis.

24th.—Jaundice, excessive engorgement of liver, repeated synoope, dyspnœa; vomiting bile, mucus, blood.

27th.—Passed much pus by bowels, hepatic pain and swelling reduced, still nausea, vomiting, profuse cold sweats; repeated syncope, pulseless, odour as of a dead body, large offensive grumous evácuations, dysuria, tympanitis, pulseless, exacerbation every evening, total sleeplessness, dysentery, great emaciation. Had three relapses.

Treatment.—Leeches to liver and abdomen, blisters, alkalis, diffusive stimuli, beef tea, hot bottles to body, plummers pill ter. die, turpentine foti to abdomen, Prussic acid, creasote and laudanum stupes for vomiting. *Quinine and wine,* but vomited, followed by collapse as often as given, given also in enema, aggravated the enteric symptoms. Took 3 grains of morphia at bed time. Beef tea, wine, brandy, and alkalis chiefly. Very slow convalescence.

No. 10.

17th August 1865.—In ardent fever, jaundiced, liver very painful, swollen, gall bladder distended, abdomen peculiarly burning hot.

20th.—In great collapse, anxiety, dyspnœa, liver greatly distended and painful.

21st.—Has pneumonia, profuse expectoration of bile, mixed with bloody pus. In profuse clammy perspiration, but says he is burning hot, tongue covered with thick yellowish green fur, mouth very bitter, conjunctiva brownish green.

26th.—Died exhausted and suffocated.

Treatment.—Cupped on admission over liver, calomel gr. x. stat. Diaphoretics, hot bottles to body, Quinine gr v. Pulv: Jacobi gr. iii. ter die. Alkalis, diffusive stimuli, beef-tea, wine, brandy, hot foti to chest, became moribund on the 25th August 1865.

No. 11.

22nd August 1865.—Admitted in collapse, semi-comatose, cold dry skin, drunken-looking countenance, became comatose at 4 P. M., evacuations passed in bed.

Treatment.—Blisters to neck and liver, hot bottles to body, alkaline mixture, diffusive stimuli. Midnight,—Pulse 100, warmer, semi-comatose.

23rd.—Conscious, continue medicine.

24th.—Doing well. Took Nitro Hydrochloric acid and Chyretta up to the date of discharge on the 14th September 1865.

No. 12.

In severe typhoid bilious fever, liver painful, engorged, nausea, vomiting, repeated syncope, profuse wasting perspiration, no sleep, dysuria, odour of death, large quantity of pus discharged by bowel, liver lessened, but constant vomiting continued, rapid emaciation.

Treatment.—Sinapisms to liver and bowels, hot bottles to body, alkalis, diffusible stimuli, emulgent doses of mercury, morphia at bed time, vomited quinine as often as given, caused great pain and long continued nausea and profuse cold sweats, Ammonia, Œther and Brandy, Beef-tea, &c. &c.

Died in syncope upon her bed.

It would needlessly prolong this report to abstract more cases, they all presented features more or less similar to the above, and I think these sufficient to shew the peculiarity of the cases in this Epidemic.

Observations.

I stated in a former part that I considered the same morbific agents had originated this Epidemic as Cholera or other fevers, and my reasons for entertaining this opinion are founded upon the following facts.

I do not mean to assert that Cholera biliosa and asphyxia, and the severer forms of fever, such as this epidemic, are *identical,* but, when the algide stages of these fevers are compared with those of cholera, especially cholera asphyxia, in which there may be neither vomiting nor purging, but mortal collapse only, it must be confessed there is a striking similarity between the symptoms, such a similitude as to impress one with their close relationship. And this becomes all the more manifest when a patient has passed through the algide stage of cholera, for we then have to treat him for *remittent or intermittent* fever, *as I had in several of the cases of cholera* which preceded *and were contemporaneous with this fever as an epidemic.* Indeed, the collapse of Cholera, and the repeated collapse in these fever cases, which in both instances preceded the reaction of the febrile paroxysm, appear to me to be a good indication of the measure of the intensity of the same poison within the body.

If we do not admit the *identity* of the morbid *causes*, then we must admit that a cause which induces intermittent and bilious relapsing fevers is present at the same time producing almost exactly the same train of symptoms.

Many cases of Cholera, I know, are not followed by any fever of re-action, but, may not this be often owing to the almost total elimination of the *materies morbi* by vomiting, perspiration, and purging, in such cases as are recoverable, and do recover without consecutive fever?

The pathological appearances are so similar in cases of severe remittent fever and cholera, that the records of the two diseases are one in character.

As in cholera, so in this fever, lately epidemic, the patient may be seized with the sudden collapse without premonitory signs, and so remain in articulo mortis for hours. But the same premonitory symptoms *are* often discernable, there is the restless anxiety and haggard face, precordial oppression, nausea, ringing and booming in the ears, indescribable malaise, the syncope, collapse, suppression of urine, subsultus tendinium, corpse-like countenance, burning heat within, cold skin, restlessness, stupor or acute consciousness, hiccup, and coma; these symptoms in both diseases ranging in every degree. In both the storm may last a few hours only, or continue for days. In both there is the same morbid condition of the great nervous ganglia, and both eventually show disturbance within the spinal system. This is more marked in cholera usually, but not in all cases. In both diseases, if the secretive power within the viscera can be maintained, reaction sets in, ardent or adynamic (typhoid) fever is the result, and this fever becomes intermittent, and lastly vanishes.

" Heidenhain, who has practiced for 28 years at Marienwerder in Western Prussia, where intermittent fever and its congeners are ripe, makes some interesting observations with respect to the relation between malarious diseases and epidemic cholera. On the occasion of cholera in 1831, intermittents ceased entirely in Marienwerder, and did not occur in the epidemic form until 1849. Even in 1844 after an inundation had subsided, and the atmosphere was poisoned with effluvia of decomposing vegetable matter, intermittents did not appear. But in 1849 with the cholera all the forms of intermittent fever returned with greater pregnancy ; in 1850 and

1851 they increased still more; and in 1852, the bad years of the cholera, they were at their maximum, but did not as in 1831 disappear with the cholera, but remained the prominent form of disease until the autumn of 1856, since which time they have diminished."*

I think the above is very strong evidence in support of the doctrine of the *unity* of the morbific agents producing cholera and the allied diseases so common in India.

Rosenthal found that the motor nerves of a frog became insensible at about 158° Faht.; at 140° Faht. excitability was set up, and continued for four or five seconds; at 122° Faht., it continued sixteen seconds; at 104° Faht. more than ten minutes, but a heat from 104° to 113° produced tetanus of twenty seconds duration; a heat from 113° to 122° Faht., produced paralysis.† Budge‡ has found the *extirpation* of the *abdominal ganglia* in rabbits caused softening of the fæcal pallets, the fæces were pulpy and covered with slimy mucus, the secretion of mucus occurring to a great extent; that the peristaltic action was increased, that the blood vessels enlarged and seemed to allow of transudation of blood through their walls, and that the liver also enlarged.

Now, if these physiological facts be put together, I think they go far to aid us in our interpretation of the pathological conditions under consideration. It is well known that long exposure to intense solar heat in the tropics is followed by increased excitability, and ultimately paralysis of the voluntary and involuntary muscles as often seen in heat-asphyxia, and I think if we allow that the ganglia of the sympathetic participate in this state of nervous exhaustion primarily by heat, or secondarily through a toxæmic condition, the viscera under their influence will, for the time being, be placed in a condition analogous to that in which nervous influence had been entirely removed by extirpation of the ganglia.

In the first degree, excitability ensues; in the second, paralysis with congestion of the viscera, liquidity of the fæces, exudation of excess of mucus, or transudation of serum from over-distended vessels.

Solar heat and its inseparable *electric phenomena* produce a

* Year Book New Sydenham Society, 1859, page 149.

† Year Book New Sydenham Society 1860, page 47.

‡ Do. Do. Do. 1860, page 44.

blanched surface, and internal ardent heat; and if we have added to a high temperature, malaria in any form, the nutritive processes dependent on nervous influence are suspended in a greater or less degree, and abnormal retrogressive metamorphosis of tissue proceeds with alarming rapidity, every exacerbation being accompanied by further textural dissolution, excessive waste progressing without repair. The malaria has affected the constituents of the blood, and chemical compounds are formed inimical to life and foreign to the blood itself in a condition of health. The generation and development of the normal components of the blood and tissues are arrested, while the disintegration of these constituents proceeds without remission or intermission, sometimes with distinct intermission; in some cases the tendency to death is so rapid that nothing short of complete and continuous nervous paralysis can account for such a condition.

We must bear in mind the almost universal presence of ferments in the air, to which M. Pasteur has especially drawn attention, and that these abound in all tropical climates and must, of necessity, do so in and about large cities far removed from the sea coast, wherein the ozone must be greatly diminished, and often altogether absent, as we know it is at times.

In India we are always surrounded by the agents of disease, which in other climates appear only to manifest themselves at intervals of time; but in the tropics, as elsewhere, the agents manifest themselves and appear at times to become intensified, especially after great *atmospheric evolutions*, —and hence it is, I believe, that diseases constantly present amongst us as *varieties*, appear at times as epidemics, and almost as distinct species.

The condition of the atmosphere, the quantity of malaria absorbed, and the vital resisting condition of the viscera, determine, I believe, the nature of the attack, and I look upon the nature of the disease as an index of the extension of the *materies morbi*, and the deterioration of the fluids affected: a leaven enters the body and will lay waste every structure before it to the very foundation in such subjects as possess but low vital resisting powers.

OBSERVATIONS ON QUININE.

I do not think I ought to conclude this report without forwarding my observations on *quinine*, as I have already

stated that I no longer view it as the sheet-anchor whereon to rely in the treatment of fever.

Perhaps the remarks already submitted touching the relationship of these fevers, cholera and other diseases, would imply that I treat (or would recommend to be treated) these fevers without quinine. I certainly do not use quinine as I used to do, for the following reasons, which I must transcribe at full, lest I be mis-apprehended.

1. Is quinine a prophylactic or preventive of a recurrence of fever?

During the Central India Campaign under Sir H. Rose, in 1858, having repeatedly to bivouac in miasmatous jungles, and to afford medical aid to Engineers engaged in siege works at nights in malarious vicinities of forts, I considered it my duty to guard against fever by taking quinine regularly at bed-time, I did so for a long time, yet I contracted severe remittent fever which lasted on and off for more than a year.

In December 1859 the Agent to the Governor of Madras in Vizagapatam paid an official visit to the city of Jeypore, he was accompanied by an Engineer and another Military officer, and by a large civil establishment. These officers, with many others of the deputation, took quinine as a prophylactic, and almost all contracted severe jungle fever.

While in medical charge of the Engineer's establishment at Dowlaishweram, from 1858 to 1864, it was my practice to supply such officers and artificers as proceeded up the river Godavery with quinine, and notwithstanding that they took it in prophylactic doses, I do not know of a single officer or artizan who escaped fever.

In January 1862, a company of Madras Sappers, 100 strong, proceeded to Jeypore, they returned to Head-quarters in 1863, 40 strong; during the time they were there they were continuously and liberally treated with quinine, and from the 40 survivors who returned, 22 suffered *then* from fever, 13 having organic disease of the liver and spleen.

In 1865 forty-three Sappers arrived in Bangalore from the Wynaad, suffering from fever, quinine had been liberally prescribed for them while sick in the Wynaad, but it had not held the fever in abeyance, and of these sick, while taking quinine in my hospital, several contracted this severe bilious relapsing fever, epidemic at the time.

Two officers recently left Bangalore on a shikar expedition; they were away two months, and during this time carefully took daily prophylactic doses of quinine (now and then large doses), they both of them returned and suffered from severe intermittent fever, both of which cases yielded rapidly to treatment without quinine.

I have employed quinine in all doses from two grains to twenty-five at a dose. I have given it by the mouth, per rectum and hyperdermically. I have combined it with the mineral acids, with alkalis, with Epsom salts, and with coffee, and in simple water, or as a pill. I have administered it during a remission or intermission, immediately the symptoms abated, in half an hour, one hour, or longer intervals, and immediately before the expected attack, and, after carefully weighing the evidence of ten years' experience of its virtues in India, I cannot help concluding that *quinine is neither a prophylactic of fever nor a certain preventative of a recurrence of fever.*

2. The inadequacy of quinine as a prophylactic of fever, the uncertainty of its operation in preventing a recurrence, the dangerous visceral complications which ensue during its exhibition, the intolerance frequently manifested, the pathological condition of the nervous system it often induces, have led me to study its action carefully.

Therapeutic action.—I have found a dose, from 2—5 grains, cause increase in arterial action, and in the number of respirations per minute. A 10 grain dose depresses the nervous forces thus: during the first two hours arterial action is accelerated, there is a fulness in the head, a sense of heating and throbbing, ringing in the ears and giddiness, more or less turbulence of the heart's action, frequency of pulse, feeling of general heat, exhalted sensitiveness, then perspiration and exhaustion. From 20 to 25 grains aggravate all the above effects, there is great buzzing, ringing and booming in the head, anxiety, restlessness, and precordial oppression, mental excitement, prostration, dimness of vision, weakness of voice. dyspnœa, inability to move hand or foot, repeated syncope, cold perspiration, fainting, and a feeling of impending death. Then vomiting and purging and abdominal pains and considerable exhaustion for many hours afterwards.

3. In the *absence* of fever from 3 to 5 grains act as an *irritant*, cause nausea, vomiting, thirst, constipation or purg-

ing, fever, headache, and giddiness. If febrile symptoms with gastric irritation exist, it exasperates the fever. Increasing doses exert their powers upon the cerebro-spinal and ganglionic system of nerves, and the effects above noted, I believe, are due to an induced hyperæmic condition in these systems,—in the ganglionic system first.

In poisonous doses (which we call full cinchonism) quinine appears to act equally upon both system of nerves.

The symptoms of the action of quinine convince me, that it induces cerebral congestion, then anæmia, which is soon followed by spinal and ganglionic hyperæmia, as the cardiac turbulence, dyspnœa, hepatic and enteric symptoms, followed by the algide condition of the body, I venture to think, show.

4. In many cases of fever I found its use followed by (1) gastro-enteric irritation, (2) augmentation of nervous disorder, (3) increased febrile action, and this especially so in remittent fevers.

5. I find that wherever *visceral* disorder exists in fevers, quinine is not only inert but injurious, and that however slight the visceral complication may be, quinine requires to be administered with much caution, and I find it is contra-indicated in fevers, in which (1) there exists gastric derangement, (2) cerebral disorder, (3) hepatic or enteric complication.

I believe it to be owing to its inducing further hyperæmia of the nervous centres, that it fails in producing good effects in many cases and leads to a recurrence of fever, and that its continued use often causes irritation to pass into inflammation, and that where acute inflammatory conditions exist, such states may be converted into ulceration and gangrene.

The conclusions I have formed are that—

(a.) Quinine is not a prophylactic of fever.

(b.) In intermittent fevers without complications, quinine given during the intermissions, acts with almost uniform success.

(c.) With visceral complications it is injurious.

(d.) In uncomplicated remittent fever it is valuable.

(e.) In complicated cases it is injurious.

The general rule for exhibiting quinine should be, I think,

1. To correct the state of the primæ viæ before giving quinine.

2. To examine carefully for indications of visceral disorders, and to relieve these by local depletion, and alterative doses of mercury and other eliminants.

3. The thermometric range of the body to be daily watched. This is often of more importance than the state of the pulse, or feeling of the skin. And as a rule not to give more than ten grains for a dose; that it is better to range from two to seven grains for a dose, two grains every two hours during apyrexia, I find more certain than large doses given at longer intervals.

4. To watch for the symptoms of the specific action as we would for that of mercury, and when cerebral symptoms occur, to reduce the quantity and frequency of administration, or omit it entirely.

In the Bengal epidemic, in the Burdwan and Nuddea Districts, Dr. Elliot found quinine useless in the *early* stages, that it increased the fever, and that even in some cases where there were partial remissions and the type of the fever had become intermittent, there remained the same tendency to local determinations of blood, which must be overcome before quinine was administered; for this purpose (says Dr. Elliot) repeated blisters were the most efficacious remedies.

Dr. Donaldson, writing on the cobweb treatment of fever,* says his experience is, that quinine given during a severe paroxysm of fever, especially where there are head symptoms, not only fails in its effects, and does not retard the progress of the disease, but if given in large doses really aggravates all the symptoms, and does not tend to lengthen the succeeding intermission.

Dr. Cameron, for some four years Civil Surgeon at Seroncha, in the Nagpore territory, informs me that his experience after treating many thousands of cases of intermittent fever is—(1) that quinine is not a prophylactic, (2) that it does not prevent a return of fever, (3) that the disease may or may not be modified while quinine is given, (4) that large doses usually appeared to aggravate an attack, (5) and that he considered it a dangerous medicine when visceral complications are present.

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* Indian Lancet, April 1860.

Now, in the *remission* of a paroxysm of severe malarial fever, there is no true cessation of the febrile condition; the hitherto rapid abnormal changes *are still going on in a less degree only* in the fluids and tissues. Hence the inadequacy of quinine given during this condition, hence the rejection of the remedy until the nervous disorder is allayed.

According to Dr. Maclean,* quinine given in a full dose "*not less than fifteen grains,*" the moment remission arrives (so as to induce its poisonous action), will "arrest the paroxysm quickly, simply, and effectually," when administered *early.*

In the algide condition of remittent fever, such as Dr. Maclean states were brought to him in Hyderabad "in a semi-comatose state," quinine, with concentrated beef tea and brandy, would doubtless snatch them from impending death, as I myself have witnessed; but was this giving quinine in the *early* stage in ardent remittent fever? When so given it is doubtful to my mind, whether the *concentrated beef tea* and *brandy* had not a greater share in the resuscitation than the quinine. I could adduce many cases, exactly of this type, so snatched from impending death by strong beef tea, brandy, ammonia and æther, without one grain of quinine.

There can be no doubt quinine is valuable in asthenic diseases and constitutions, in scrofula, in cachexia following hæmorrhages, in asthenic rheumatism, erysipelas, phagedæna, and mortification,—in fact, in all diseases in which a nervous and vascular stimulant is indicated.

I doubt whether we do not lose much (in the extraction of this alkaloid from cinchona) that is equally valuable in the other constituents of bark. We cannot imitate the beautiful combinations of Nature's chemistry, and I question whether we gain therapeutically in our endeavours to decompound for the possession of this less bulky alkaloid.

I venture to think it would soon be made manifest were we to substitute *thein* for tea and coffee, that we had lost other ingredients which perhaps would be found of more importance than the less bulky alkaloid.

I am inclined to think the active *principles* of bark do *not* exist in the mere alkaloids *our* chemistry has produced, but in the *combinations* of these substances with other indispensable elements *plus* the lignia.

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* Professor Maclean quoted by Dr. Aitken. Op. cit. Art. Remittent Fever.

In Cinchona there are*

Ingredients	*Properties.*
A Volatile Aromatic Oil.................	Stomachic.
Tannic Acid	Peptic and Nervine.
Red Cinchona.	Stimulants.
Kinic or Quinic Acid.	Stimulants.
Kinovic Acid.	Stimulants.
The Alkalies Cinchona	Stimulants.
Oxides. { Quinia. Arcinia.	Stimulants.
Yellow colouring matter...............	Possibly Stomachic.
Kinate of Lime..............................	Tonic Corroborant.
Gum..	Peptic.
Lignia	

Are the above constituents, minus the alkaloids, valueless? I wot not.

Berzelius considered *that* bark the most efficacious containing the most *Tannic* acid.†

I do not think we can decompound such a production as cinchona bark, and obtain its entire specific effect from a totally different artificial product, a *sulphate* or *disulphate* of *quinine* In its *natural* condition its alkaloids are neither a sulphate nor a disulphate, but they are the *tannates* and *kinates* of quinia.‡

Now, it is well known that infusion of bark will often be retained with good effects, while the disulphate of quinine cannot be tolerated, and this, I believe, is owing to the presence of those constituents, which, as a whole, rendered bark famous as a medicine, before chemistry had succeeded in extracting and changing its bitter alkaloid into *sulphate* and *disulphate* of quinine.

I may mention, in conclusion, that I have treated latterly many cases successfully mainly by the administration of *large doses of Ipecacuanha and half drachm doses of finely powdered charcoal three times a day.*§

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* Pereira's Materia Medica, Part ii., page 993.

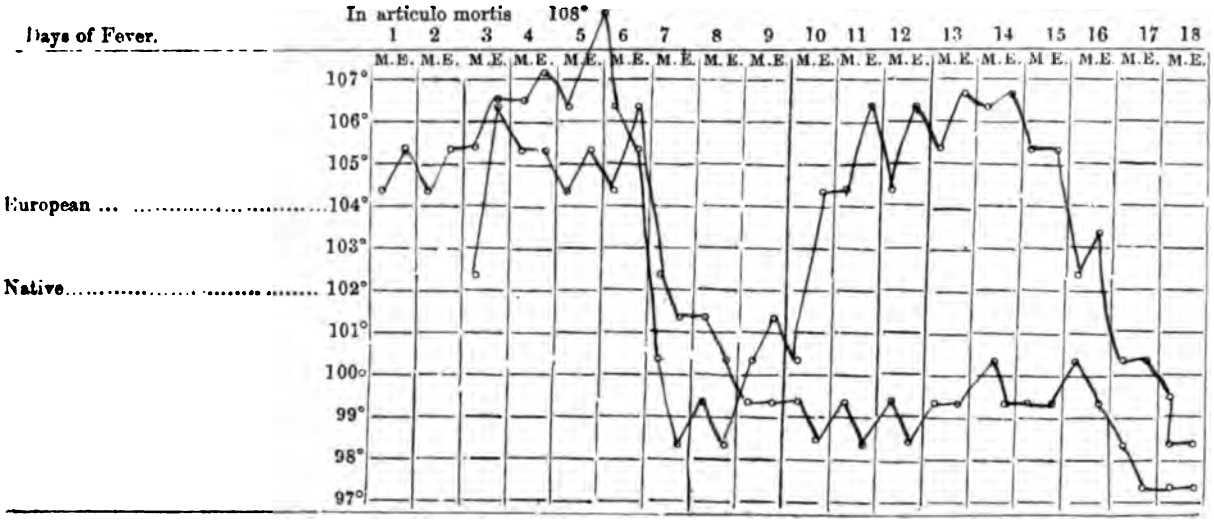
† Traite de Chem, s. 587.

‡ Dr. Allison (London Medical Journal, January 1850) considered tannin a valuable peptic and nervine.

§ On referring to Thompson's London Dispensatory I find (Art. Carb Ligni.) he mentions that Dr. Calcagno, an Italian physician, proposed to employ it instead of bark in intermittents.

Table shewing the daily temperature of the body in Bilious Relapsing Fever.

Heat taken beneath tongue. Thermometer in mouth 3 minutes each time.



From a long series of thermometric observations I find the normal temperature of the Natives of India to be 97° Fahrenheit.
These two ranges show the progress of the fever in European and Native.
A heat above 102° indicated danger.

THOS. LOWE,
Brevet Surgeon.

PART II.

REVIEWS AND NOTICES OF BOOKS.

Essays and Reports on Operative and Conservative Surgery. By R. G. Butcher, Surgeon and Lecturer on Clinical Surgery to Mercer's Hospital, Dublin, &c., &c. Illustrated by sixty-two lithographic plates, coloured and plain; and several wood engravings. Dublin: Fannin and Co., London: Robert Hardwicke. 1865, large 8vo., pp. 933.

There has been a great tendency lately to the production of "big books" on Medicine, Surgery, and the allied Sciences; great, unwieldy volumes, which cannot be held in the hands with comfort, but must necessarily have the support of a table or reading-desk when under perusal. Witness Carpenter's Physiology, Human, and General; Erichsen's, Miller's and Pirrie's Surgery; Aitken's and Tanner's Medicine, &c. We think the old system of publication, in two or more moderate-sized and easily-handled volumes, far preferable to the monstrous one-volumed productions under notice. Of course our objections do not hold as regards dictionaries, cyclopædias, and works of general reference, but only to those books which one naturally desires to read at ease, and probably reclining in a lounging chair. Mr. Butcher's work is of the latter kind; but, nevertheless, it falls under the description given in our first sentence. Having premised so much of its size and weight, we purpose giving a slight notice of its contents.

The volume before us does credit not only to the Author, but also to the Publisher, Artist and Printer. The paper is of excellent quality, the type very clear, not "solid" but just sufficiently "leaded" to render perusal an easy, pleasant matter, even to eyes which have worked for forty years; and the lithographs are beautiful works of art. As to the author, he has, by his own hand, raised to himself a lasting monument

of his ability and success as an earnest worker in the field of Practical Surgery.

We are told in the preface:—

"The book, it is needless to observe, is not intended to represent a 'System,' or 'Theory' of Surgery. It professes simply to record some of the actual experience of one, who, commencing as a Hospital pupil at an early age, has been, for the last quarter of a century, assiduously employed in the field of Practical Surgery; and who has endeavoured to exhibit the work of a Surgeon as it presents itself at the bed-side and in the operating theatre."

The book, then, is eminently "Clinical," a style of work for which we have a great predilection. Several of the Reports are quite familiar to us, as the greater number of them have appeared at various times in the pages of the *Dublin Quarterly Journal of Medical Science.* The first that we remember to have heard of Mr. Butcher was in 1851, when he published in Vol. XII of the journal just mentioned, some cases of amputation and a description and woodcut of a new saw. This description with a few verbal alterations, has been imported into the Essay, "*on Excision of the Knee-joint,*" which occupies the first place in the book under notice, and the foundation of which appeared in the *Dublin Journal* for February 1855. Curiously enough, the letters indicating the different parts of the instrument, are retained in the text, but omitted from the lithograph copied from the original wood-cut. This saw has since been modified and simplified, and a lithograph of its improved form is given. From a practical acquaintance with the instrument, we can testify to the great utility and almost universal applicability of "Butcher's Saw" as a bone-divider; the blade is so fine, and yet can be kept so rigid, that it readily cuts on a curve; the fine teeth are so beautifully set that it cannot be locked, and we have never found the necessity for the bone-forceps to follow its use. Mr. Butcher cannot and apparently does not claim strict originality for the instrument; it is a modification of the bow-saw used by cabinet-makers, and so dexterously handled by Chinese carpenters.

This Essay on *Excision of the Knee-joint* affords a complete history of the operation. The merit of proposing and of first publishing a successful case is given to Mr. H. Park, of Liverpool, who recounted in 1782 the particulars of a case most successfully operated on in the previous year. After this had been made public, Mr. Filkin, of Northwich, claimed

priority, having excised the knee of a man in 1762, which man was living after the date of publication of Mr. Park's pamphlet. But the details given by Mr. Filkin's son, after his father's death, do not afford any evidence as to the usefulness of the limb in progression.

Mr. Butcher collects all the published cases into two groups. The first comprises those from Filkin's operation "up to the period of its abandonment after Mr. Syme's failure in 1830," to which, he adds "an unhappy catalogue" of operations by foreign Surgeons from 1832 to 1849.

The first half of this table comprises thirteen cases with seven deaths; and of the six "recoveries," it is stated that two had "useless limbs." A very unsatisfactory result, but the deaths were not all due to the operation; one was from dysentery, one from tetanus, and in one of Sir P. Crampton's cases, which was fatal, he acknowledged that the operation was not applicable. Mr. Butcher, who seems to take special delight in falling foul of Mr. Syme, says that he thinks it

"very questionable how far the fatal result in his (Mr. Syme's) second case should be ascribed to the operation of excision. The surgery of the case is imperfect and bad; for *after* the operation the limb was not placed in proper position, and the child was subjected to additional violence in eleven days after the first operation."

The second half of the table offers still more unsatisfactory results. It comprises eighteen cases with ten deaths, five recoveries, one subsequent amputation with recovery, one deformed limb (entered as a recovery), and one unaccounted for. So that we do not wonder at Mr. Butcher calling it "an unhappy catalogue." Of these eighteen operations, six were by Textor, with one complete recovery and one recovery after amputation; four by Fricke, with two recoveries, one with deformed limb; three by Demme, with one recovery, one unaccounted for; three by Heusser, with two recoveries; one by Lang, and one by Heyfelder, both died.

The second group of cases comprises those which were operated on from 1850, when Sir W. Fergusson revived the operation, until the end of 1854. Mr. Butcher gives a short summary of each case. The total number is thirty-one, with five deaths, eighteen cured, six rapidly recovering,* one

* We are subsequently told that of these six cases, one underwent amputation and recovered, and the other five recovered with perfect use of the limb.

under treatment, and one "encouraging." Of the five deaths, there was one from operation, one from epidemic dysentery, one from pyæmia, one from obstinate diarrhœa, and one from phthisis (operation warranted to relieve agony). Of the eighteen cures, sixteen are said to have "perfect use of the limb."

Mr. Butcher furnishes a second essay on the same subject, with summaries of all the cases operated on between December 1854 and December 1856. In this third table he introduces eight cases operated on in 1854, and omitted from the previous table.

The table contains a total of fifty-one cases, with ten deaths (one after amputation); sixteen cured; six recovered after amputation; one relieved; one in a precarious state; eleven recovering (in two union delayed); five under treatment; and one unaccounted for.

In the second table there is entered one successful case by Mr. Butcher; besides this, he gives details of four other excisions of the knee which he has himself performed, three with the most gratifying results, and the fourth fatal. In this case, six weeks after the operation the limb was solid, rigid and straight as an arrow, and the man progressed well for other six weeks, when unhealthy erysipelatous inflammation, with prostrating fever, set in, and the man sunk blood-poisoned.

Mr. Butcher believes he has collected all the cases operated on by British Surgeons; if there are any omissions it is not his fault, he has faithfully given the results of all the cases on record, or of which he could gain information by enquiry. Excluding the "unhappy catalogue" and the other cases by foreign Surgeons, which find a place in his first table, we have the following general results of all the known operations performed in the United Kingdom.

Total number of excisions of the knee-joint recorded by British Surgeons to December 1856	93
Perfect primary cures with good useful limb	39
Recovering rapidly (at time of report) with every prospect of good useful limb	14
Recovering, but union between the bones delayed ...	2
Recovering, under treatment at time of report ...	6
Reported to be "encouraging"	1
Failure of excision, but recovery after amputation ...	7
Recovery with *useless* limb	2

Relieved, partial excision	1
In a precarious state (at time of report)	1
Unaccounted for	1
Died (Dysentery 2, Diarrhœa 1, Phthisis 1, Organic Disease 1,)	19
Total of Cases...	93

Admitting the cases with delayed union, those under treatment, and the encouraging one, as successes, we have a total of 62 cures to 31 failures; and if we eliminate the seven cases in which the operation of excision proved no hindrance to ultimate recovery after amputation, we may calculate a still higher proportion. Surely this is sufficiently encouraging to render it imperative on the Surgeon to resort to the operation in preference to amputation, *in suitable cases.*

We should not be doing Mr. Butcher justice if we did not mention that he lays great stress on proper selection of cases. No doubt, a great part of his own success (4 successes to 1 failure) has been due to the careful manner in which he has at once adjusted the limb, and the very judicious after-treatment which he has pursued, and on the importance of which he writes most earnestly.

The next essay is on *Excision of the Elbow and Wrist-joints.* Excision of the elbow has been so repeatedly performed with such marked success, that we may here dismiss it as an acknowledged operation of conservative Surgery. We extract the following hint:—

"*New operation for bony anchylosis at the elbow-joint.*—I have frequently performed the following operation on the dead body, and a dexterous hand may readily accomplish it in the living. The arm being placed in the same position as that for resection, an incision should be made, about an inch in length, behind the internal condyle, and the ulnar nerve freed from its bed, and drawn forwards with a blunt hook; a second incision should pass outwards to the most prominent part of the external condyle, at right angles with the first, dividing the integuments and ligamentous expansion covering the olecranon. The fine blade of the saw which I use for resection being detached, it should be passed from the extremity of the transverse incision—that is, from without inwards, in front of the condyles and the joint, its flat surface being applied to them : the blade, being sharp at the point, can be readily made to pass along this direction, and by drawing the integuments a little in front of the internal condyle it will appear through the perpendicular incision, or that made in the first instance ; the serrated edge may then be turned

backwards, the blade connected with its frame, a few movements will sever all resisting parts from before backward, corresponding to the line of the transverse incision through the soft parts; the limb should then be bent at less than a right angle, and any vessels requiring ligatures must be secured. The after-treatment should be exactly in accordance with the rules laid down when speaking of resection. An operation accomplished after this plan is not, I conceive, nearly so serious a measure as excision of the joint; the brachial artery need not be considered in danger, except through undue rashness, and the hopes of a more perfect motion may rationally be expected when no muscular attachments are divided."

In performing the operation of excision of the wrist-joint, Mr. Butcher appears to prefer a semi-circular incision on the dorsum of the joint dividing the extensor tendons. He briefly relates a case in which Mr. John Simon removed all the carpal bones (except the trapezium and pisiform) and one of the metacarpal bones, by means of two longitudinal incisions passing between the tendons, one on the dorsal and the other on the plantar aspect. This operation was witnessed and the after-treatment watched by the present writer, and there was no unusual difficulty in the case, which ultimately did well. Certainly it seems desirable that the tendons should be as little interfered with as possible. We lately saw in one of the Medical Journals reports of some very successful excisions of the wrist, performed by Mr. Lister by means of incisions along the radial and lunar borders of the hand; but we regret to say that our memory does not serve us as to the Journal in which the reports appeared.

Of course it is not our purpose to follow Mr. Butcher, essay by essay, through his book. His cases of excision of both the upper and lower jaw are very successful, and a perusal of them can leave but one impression, viz., that Mr. Butcher is as bold in conceiving as he is skilful in executing. Some of the most successful of our author's operations are for hare-lip. In some most unpromising cases he has produced the happiest results. His own descriptions must be read to appreciate the masterly way in which he deals with difficulties. We think that a great part of his success is due to the fact that he freely separates the lip and cheek from their attachments to the maxilla, and thus permits the parts coming together without any dragging on them.

There is one case to which we would especially refer, as a great number of our readers must have ample opportunity of

putting the operation to the test of an enlarged experience. We allude to ligaturing the main artery of the limb for the cure of Elephantiasis Arabum, a proceeding first devised by Professor Carnochan of New York. Mr. Carnochan's paper we have not seen, and the first we heard of the operation was on the perusal of Mr. Butcher's report in the *Dublin Quarterly Journal* for May 1863. In that report Mr. Butcher states that, in the only case in which he has operated, sufficient time (18 months) had not elapsed to judge of the ultimate permanence of the cure; but in the work under review, he is enabled to state that the cure is fully established, for four years after the operation he "showed the patient at the hospital, perfectly cured, and able to follow her severe occupation (that of a laundress) without interruption." The case was just one of those that may be seen by dozens every day in the streets of Madras. The patient was a female, aged forty-four years, and she had suffered from elephantiasis of the right lower extremity for eighteen years. There is a lithograph of the patient showing very characteristically the deformity of the limb. We much prefer the original lithograph in the *Dublin Journal*,—which gives an idea of the patient's age, and depicts a countenance indicative of long suffering,—to that which is inserted in the volume before us, which represents the patient as a young woman with quite a placid expression.

The operation was most carefully performed; the artery lay at great depth, and the vein was very enlarged and engorged with blood, and produced considerable difficulty by rolling itself over and concealing the artery. However, everything was most successfully and satisfactorily managed. Mr. Butcher gives us the measurements of the limbs before the operation, but afterwards omits any definite information of this kind, contenting himself with reporting "progressive diminution" and ultimate "perfect cure."

We are not aware whether this mode of dealing with elephantiasis of the limbs has been put in practice in India. Ever since we read the above-mentioned case we have looked with artery-tying intent upon every enormous "elephant leg" which we have seen in our daily peregrinations; but our professional position has not hitherto permitted of our performing the operation. We hope, however, it will not be very long before we are able to record in this Journal that ligature of the femoral artery has been successful in the treatment of

elephantiasis cruri. From what we know of the readiness with which persons suffering from elephantiasis scroti submit themselves to ablation of the affected parts, now that they are aware of the success which has in numerous cases been achieved, we believe that a very few successful cases of ligature of the femoral artery would produce numerous applicants at our Hospitals and Dispensaries, willing to submit to the operation in the hope of being rid of the great burthens which they now literally drag along.

Perhaps restorative Surgery never had a greater triumph than that which Mr. Butcher secured in the case of Mary M'N., related at page 757 of the present volume, but first published in the *Dublin Quarterly Journal,* February 1862. The case is headed "Shocking deformity after burn; the head bound down to the shoulder; perfectly cured, with scarcely a trace of deformity, by a new operation." A lithograph shows the appearance of the girl both before and after the operation. We have not space to enter into full details; we can merely mention that the operation consists essentially in raising the cicatrix as a flap, and freely dividing the citatricial tissue from beneath upwards, carefully saving the integument from injury, until the flap can be spread out and adjusted upon such surface as it will cover; of course a large wound uncovered by flap must be left to cicatrize. Mr. Butcher believes that his mode of operative procedure is entirely new, in fact he speaks of it as that "which I claim for my name." He reports that the case in point was seven months under treatment, and that there was such successful dealing with the cicatricial tissue and such careful after-management, that at the end of seventeen months after operation, there had been no disposition whatever to a recurrence of deformity. We think a little more time must elapse before the girl can be said to be perfectly cured, for at the time of report but ten months had passed since discharge from hospital, which cannot be considered a sufficient period to allow of a positive assurance that none of the secondary contraction which is usual in a newly-formed cicatrix will occur.

Mr. Holmes Coote says in the third volume of Holmes's *System of Surgery,* writing of contracted cicatrices from burns:—

"Surgical ingenuity has been pushed to the uttermost to devise operations by which this distressing calamity may be removed;

but I express the opinion of most Surgeons of experience of the present day, in affirming that hitherto all such operations have proved failures; and for this simple reason, that whenever an incision is made, a new cicatrix must be formed, and this new cicatrix will undergo precisely the same process of contraction as the former, which it was intended to alleviate.

"It may be laid down as a rule almost without exception, *that a cicatrix should never be touched with the knife.* And we find that these operations have for some time past been discarded as useless at St. Bartholomew's and some other leading Hospitals of London."

It is scarcely necessary to say that Mr. Coote recommends persevering, unremitting, gentle traction, so as to gradually extend the cicatrix. We doubt if Mr. Coote had read Mr. Butcher's cases at the time his article was written.

We have already said that we think so highly of the work before us, as to look upon it as a monument to Mr. Butcher's ability as a scientific and practical Surgeon. The book deserves to rank among the standard works on Surgery. But we think it a great pity that writings which may stand for all time should be marred by controversial pettiness. We have noticed, when upon the subject of excision of the knee-joint, Mr. Butcher's tendency to fall foul of Mr. Syme; this is still more manifest in an otherwise admirable essay on *Treatment of Fractures of the Thigh-bone.* We do not mean to say that Mr. Syme's own writings are at all clear of very objectionable sneers at the practice or capacity of his brother Surgeons, but we challenge contradiction when we affirm that these are blots in Mr. Syme's essays. "Tit for tat" may be very "fair play," but we would ask Mr. Butcher whether it would not have been more dignified in him to have stated his own views and practice, and even to have met objections, without descending to the petty criticisms which mar this great work.

It is not only Mr. Syme who is made to feel the weight of Mr. Butcher's hand. We extract the following from page 160:—

"Before proceeding with the history of the case, I must say a few words about this very valuable saw which holds my name, and is used by me in all resections and amputations. In a work recently published, entitled *A System of Surgery, Theoretical and Practical, in Treatises by Various Authors,* I find allusion made to this most useful instrument, in a feeble, meagre article, forsooth, termed 'Resection'—such a production, both in style and matter,

as would place a second year's student last in his class. I perceive a review of the book in the *Dublin Medical Press* for Feby. 18th; and I will allow the reviewer to condemn the ignorance and want of information displayed in an article which should at least yield the facts and directions laid down in every text book, and recognized by all well-educated Surgeons. The reviewer thus speaks:—'The chapter upon *Excision of the Joints*, or, as we call it in Ireland, 'Resection,' is only remarkable for the suppression of every thing Irish that has been done in this branch of operative Surgery. Mr. Butcher, who has been particularly prominent in resection operations, has had his name introduced only for the purpose of villifying the saw recommended by him, which, says the author, 'is rather liable to bend and the blade to get loose;' though we find it difficult to understand how such can be the case if the saw be well manufactured, the blade properly screwed up, and the Surgeon have learned how to run such an instrument lightly and evenly.'—*Dublin Medical Press*, Feb. 18th, 1863, p. 170.

"The objections urged against the saw are too contemptible for me to dwell upon. Its great advantages I have pointed out in my memoirs on the subject of excisions of joints. Every modern work on Surgery, and Surgeons who have worked in this department speak loudly in its praises. By a regulation of the Army Board, it must be in every case of instruments. Is not all this additional testimony in favour of my saw? Therefore, I protest against incapacity robbing the instrument of its merits."

We do not stay to point out how thoroughly Mr. Butcher exposes himself to criticism in these paragraphs; but we must say that, in his own remarks and by adopting the opinion of the reviewer in the *Dublin Medical Press*, he does great injustice to Mr. Timothy Holmes the author of the article in the *System of Surgery*. The said article is not "forsooth, termed 'Resection,'" but *Excision of Bones and Joints*. It does not deserve the epithets feeble and meagre, though it is not, perhaps, so full and complete as it might be; and in our opinion the plea of "want of space" is scarcely admissible in such a work as Mr. Holmes has edited. But our readers will be somewhat surprised to learn that Mr. Holmes gives, in a succinct manner, directions for the performance of excision of the knee-joint very similar to those which Mr. Butcher recommends, even to the immediate final adjustment of the limb. As to the one great bone of contention, *the saw*, we extract all that Mr. Holmes says about it, when it will at once be apparent that by garbling the statement in another way the reviewer might have made it appear all in praise of the instrument, instead of "villifying" it. After remarking

that "difficulties are better overcome by the dexterous use of common instruments than by the invention of special and often complicated apparatus," and that "the elaborate instruments described, usually in French surgical works," appear to be designed to enable the operator "to remove the bones piecemeal; and, if so, their principle is radically bad," Mr. Holmes goes on to say:—

"The saw called by the name of its inventor, Mr. Butcher, will often be found useful. It is similar to the ordinary metacarpal saw, except that its blade is movable, and can be fixed at any angle, so that it can often be introduced and worked where an ordinary amputating saw cannot. The latter, however, is much better for sawing off a piece of cleanly-exposed bone; as Butcher's saw is rather liable to bend, and the blade is apt to get loose."

As to the non-reference to Mr. Butcher's resection operations, a great many other Surgeons might make a similar complaint, for Mr. Holmes mentions Mr. Fergusson merely with reference to "the lion-forceps," and the names of Page, Mackenzie, Keith, Holt, Pirrie, Statham, Price, Hey, &c., are not to be found in the article, and Dr. Humphry is only mentioned as having removed the condyle of the lower jaw, and excized a fractured portion of the patella!

The practical character and the excellence of Mr. Butcher's work is such that, we feel sure, a second edition will be called for before many years have elapsed, and we hope that, when this event arrives, a careful revision will take place, and all this objectionable matter be expunged. Surgeons will be glad to know how Mr. Butcher works and with what results, without being bored with controversies not always pertinent to the matter in hand.

Notes et Réflexions Médico-Chirurgicales sur les Phlegmasies de la Matrice. Thèse pour le Doctorat en Médecine, présentée et soutenue, le 9 Mai, 1866. Par ALEXANDER BOGGS, Docteur en Médecine; Membre du Collége Royal des Chirurgiens d'Angleterre; Licencié en Accouchement du même Collége; Ex-Chirurgien de l'armée Anglaise dans l'Inde. Paris, A. PARENT, 1866. 4to. pp. 184.

IT must give great satisfaction to the friends of Dr. Boggs, formerly an officer of the Madras Medical Establishment, to find that the same qualities which led him to seek and obtain that honorable position, have had an ulterior development, since his retirement from the service, in securing for him the degree of Doctor of Medicine of the Faculty of Paris.

An academic thesis scarcely comes legitimately under the hands of the reviewer. It is enough that it be presented and sustained to the satisfaction of the Examiners for the degree: and that it was so in this case is proved by the President of the Court, M. Tardieu, having certified of this thesis, "Vu, bon a imprimer."

There are three dedicatory pages, the first in honor of Professor Tardieu; the second in that of the Professors and Examiners of the Faculty of Medicine of Paris; and the third offers the respectful remembrances of a grateful scholar to all his former masters, the Professors of the Madras Medical College.

We have hinted that we do not purpose to criticize the work. But as Dr. Boggs has a good deal to say about India, we shall extract some of his remarks, leaving our readers to judge for themselves as to their tenableness. First, however, we must give an account of a remarkable family which our author has met with :—

"In this family all the females are subject to uterine affection, under one form or another, whilst all the males are afflicted with scrofulous maladies in all their varieties. This family, all the members of which bear the pathognomonic signs of the scrofulous diathesis, is numerous, and I have observed this disposition (to uterine affection) even in the youngest daughters. They are all subject to genital catarrh, and I have been consulted for a sero-sanguinolent discharge coming from the interior of the genital parts in a young

girl of seven years. The mother is affected with a chronic metritis, which is aggravated from time to time under the influence of any cause, and the malady then presents all the characters of a fresh acute metritis with peritoneal complications. The mother of this lady, who has had seven or eight children, five of them girls, died with symptoms of peritonitis, evidently having their *point de depart* in the uterine apparatus, and the young lady, her daughter, has lost two sisters with symptoms of chronic metritis; one of these succumbed, after a sickly life of many years, literally worn out by a prolonged suppuration proceeding from the interior of the womb, and from a peri-uterine abscess opening into the vagina and rectum, constituting a recto-vaginal fistula. The other sister died in child-birth, the victim of a uterine affection. A remarkable thing is, no member of this family, to my knowledge, has been attacked in the lungs. A niece of this lady, still unmarried, was treated, at the age of twenty years, for metritis, and another niece, daughter of another sister, was attacked with a chronic affection of the uterus, following an acute metritis set up a little after her marriage, at the age of seventeen years; her mother is subject to a dartrous affection. I ought to mention that the sick members of this family have been treated by different physicians, who all agree as to the diathetic nature of the uterine affection."

Dr. Boggs, controverting the opinions expressed by Drs. Henry Bennet and Tilt, that uterine and ovarian diseases of an inflammatory character are more common and more severe in hot climates than in temperate regions, says,—

"With the respect due to their talent, I must say that I do not deny the powerful and deleterious influence of heat upon the general organism of Europeans residing in the tropics, but I cannot see that this influence acts in a notable manner upon the womb. I believe, then, that hot climates have not any special influence, or a greater influence than temperate climates in the pathogeny of uterine diseases. God knows that these diseases are unhappily common enough in countries otherwise well favoured by nature, and as a proof, I may mention, that they have not escaped the penetrating eye of Mr. Michelet, who, judging our age somewhat rigorously, with the great soul of an artist, has surnamed it *the age of diseases of the womb.*"

Again he quotes from Dr. Tilt, who, in estimating the comparative frequence of uterine inflammation among Europeans residing in the tropics, says "it must be borne in mind that, whether in India or in our other tropical possessions, European women are all young: they leave Great Britain at about twenty, and seldom remain in India after forty, thus passing in a hot climate the period of life in which uterine

inflammation is most common even in temperate regions." Upon which Dr. Boggs remarks:—

"That is perfectly correct, but it pertains rather to age than to climate. We must seek elsewhere, then, the source and the true cause of uterine diseases in India, above all inflammatory diseases, and we shall find that there, as here, an attack of acute metritis is generally preceded by a chronic affection of the womb. Moreover, all that is applicable to uterine diseases in hot countries is equally so as regards the same diseases in temperate climates.

"It is remarkable that the maladies attributable to such or such climate are borne upon the organs of nutrition, whilst diathetic, constitutional or hereditary diseases oftener bear upon the generative organs, such as cancer, tubercle, scrofula; and this equally in the two sexes.

"I admit with the learned physicians who have practised in India, that Europeans are very subject to uterine affections and to the disturbances of the general functions which accompany them, whether as causes or as effects of the uterine malady, but that can be explained in another manner than by the direct influence of climate upon the generative apparatus.

"Menstrual troubles, leucorrhœas, ulcerations of the neck of the womb, and chronic metritis are common enough in India, even among the Hindoos; in that country as in Europe, the women are more or less exposed to the same determinating or occasional causes; further, and although odd at first sight, experience has shown that a great portion of the diseases of tropical countries is attributable to cold, also in Europe so powerful a cause of inflammation of the womb." * * * *

"Another cause of the extraordinary frequency of uterine inflammation among European females in tropical regions is certainly found in the deteriorated state of the blood, in the various grades of anæmia which one observes among them, and in the great debility engendered by a more or less prolonged residence in a hot climate."

* * * *

"This chloro-anæmic state is found not only amongst Europeans in India, but it constitutes almost the physiological state of the natives, and this may be explained not only by the effect of the great heat and the malaria to which they are constantly exposed, but also by their food, which, composed almost exclusively of legumes, is unsubstantial; the constitution of their blood, consequently, approaches that of the blood of a chloro-anæmic subject; in other words, their blood is more serous than fibrinous, and less rich in globules, the elements containing the colouring matter of this liquid. It is to be remarked that Europeans are more subject to inflammation than natives; their food, consisting principally of meat, is

more substantial; their blood is consequently richer in fibrine, the characteristic and essential element in the pathogeny of inflammations.

"We have to notice also that in natives and more especially in Brahmins, or legumists, inflammatory lesions terminate oftenest in resolution, whilst in Europeans, they almost always terminate in suppuration, and cicatrization advances less quickly in them than in natives. This is due to the food, or to a peculiar organization induced by the climate.

"It is remarkable that, whilst the blacks are equally with the whites more or less susceptible to the ruling diseases of the country, dysentery, or rather dysenteroid—a form of mild entero-colitis—and diseases of the liver by preference attack good livers. This is not surprising when one reflects upon the manner in which Europeans live in India, and especially the English, who, with little difference, live as in their native country. It is evident that that which is good in a cold climate cannot be equally good in a hot climate; the old residents know this so well that they rightly adopt the regime of the country, and live very nearly as the Brahmins, and they generally find the benefit of so doing; they enjoy not only better health than their compatriots, but, further, their system is in a better state to resist sudden and marked changes of climate on their return to their native country.

* * * *

"As I have said, a large proportion of the diseases in India, especially among Europeans, is attributable to cold; and this is explained by the habits which they adopt and by their garments which are not altogether suited to the climate and to the sudden changes of the seasons. Thus, although cold may be of a conservative nature for life in general, it becomes, under certain conditions, a powerful agent in the production of diseases. This is applicable to every climate, and one circumstance which greatly favours perturbations in the health of women, is the mode or nature of their costume, upon which I propose to say a few words under the title of:—

"*Garments.*—Fashion, the despotic queen of the civilized world, has always found submissive subjects, and women faithful to the caprices of this despot follow all the periodic changes dictated by fancy, unhappily too often to the prejudice of their own interests, and that which is above all, their health. How many women alter or destroy this precious gift of nature merely to satisfy the capricious conventionalities of society! and this is so true, that the wives even of those who are considered the guardians of the public health, form no exception. In this matter, the husband has no authority, and when he offers his advice, not upon the fashion, but in a prophylactic point of view, his entreaties are almost always

repelled, and fashion alone will be scrupulously followed. Such is civilized society, not only of our age, but of every time, and if we may judge of the influence of fashion by this present time, we may conclude that she will reign paramount for ever.

"There is one part of the costume of women which enjoys much favour (*un grande rôle*) in the world, but if it is advantageous to commerce, it is not so to health, I speak of *the crinoline*.

"Can the crinoline be injurious to health? Certainly. Has it any influence in the production of metritis or other uterine maladies? This we shall endeavour to show.

"If cold has any influence in inducing diseases in general, it appears to me that we shall find here a medium, which, by its bell-shape and the nature of its structure, singularly favours the action of cold upon the body and offers no protection against the inclemencies of the season; hence these frequent perturbations of the general health of women, and diseases of the womb in particular. I speak here only of those women who do not take the precaution to combat this inconvenience by guarding their inferior members against the redoubtable action of cold.

"If the crinoline is injurious to women not in the puerperal state, we can imagine its disastrous influence upon pregnancy, a state which renders woman more than ever susceptible of all morbific causes, and above all of the action of cold. * * I have seen women religiously wear their crinoline until the appearance of the first pains of parturition! * * *

"In India also the subject of garments is not sufficiently studied in a hygienic point of view; there, as here, fashion reigns supreme, (not for the natives, who wear garments the fashion of which never changes) but for Europeans, who, with the same zeal, follow the fashion of Europe, or rather that of Paris, with some modifications necessitated by the climate. But yielding to the natural heat of the climate, the ladies are always very lightly clad, and as the heat is sometimes intolerable, they seek relief in the sea-breeze, or in the cool breezes which sometimes blow after sunset, or they even create for themselves, so to speak, a climate in their dwellings by artificial means, and they obtain a considerable reduction of the temperature.

"These means consist of agitating the air of the interior with punkahs or thermantidotes [explained in foot-notes], machines well known to European travellers in India. Joined to this, the air is rendered fresh and moist by mats of straw or grass (*vétivert*) placed at one or more doors and windows and wetted all day, sometimes all night, with fresh water. This constitutes the greatest luxury of Europeans in India, and one may say the only means of rendering life supportable during the months of the greatest heat; but if this refrigeration is considered a great luxury, it has also its inconveniences,

and, in my opinion, nothing is more injurious to health, as we have seen when discussing the action of cold upon the body. I may remark here that the natives do not use these factitious means, and I believe with reason.

"Further, by an inexplicable caprice, if it is not the madness of following the European fashon, visits of ceremony are made in the day and at hours when the sun is the most ardent, without reflecting that what is feasible in one climate cannot be done with impunity in another. The truth of this fact has been more than once sadly attested. In how may cases has not the cause of a grave disorder, followed sooner or later even by death, been attributable to a chill felt, perhaps, for the first time, when paying a visit and sitting opposite to or beneath one of these wind machines, whilst the body is probably still bathed in perspiration! I can but say that I have seen many cases of uterine inflammation and even of pulmonary phthisis thus induced.

"The European inhabitants of India are always lightly clad in tissues which are more or less good conductors of heat; now physical science teaches us that a good conductor of heat is also a medium for the free passage of cold from without to within; the result is, that the body thus clad is insufficiently guarded against sudden alternations of the ardent heat of the sun on the one part, and the low temperature of the internal atmosphere of their dwellings, on the other part. But how can the natives resist the influence of the torrid heat of their country, being as they are in a state of almost complete nudity? This question presents itself naturally to the mind. Here again we must have recourse to physical science, but this time we must associate physiological anatomy with it.

"From this triple science we learn that this immunity is due to the intensity of the coloration of their skin, or rather to the more pronounced development of the Malpighian (pigmentary) layer of the membranous envelope of the body. In the white race, this coloration is confined to the Malpighian layer, whilst in the negro it extends even to the horny layer of the epidermis. Now physical science tells us again that all bodies possess more or less a power of radiation, according to the colour and the nature of their surface. By the same fact, the skin of a negro being black, this power is greater in him than in the whites; the skin of the latter, on the contrary, allows a great portion of the calorific rays easily to penetrate the tissues, even to the deeply-seated organs. In a word, the black skin is a bad, whilst the white skin is a good, conductor of heat. The result is, that the European is more susceptible of variations in the surrounding temperature, and consequently he must be more sensible of the least lowering of the heat, although always clothed.

"The *crinoline* may act also by the compression or constriction

which it must necessarily exercise upon the abdomen and its contents, whether by its own weight, or as a constricting agent, thus causing a disturbance of the functions of the different viscera, and as the pelvic organs are not exempt from this vicious influence, the womb in its turn is necessarily affected in many ways, functionally and structurally, without counting the different displacements to which it may be exposed."

We have confined ourselves in our translation entirely to the section on Etiology; and our extracts have extended to a much greater length than we originally intended, for we found, as we went on, that we were not only arriving at the views of a physician who has practised in India on the cause of disease in general and of uterine affections in particular, in this land of the sun, but were also gleaning some wrinkles as to "the manners and customs of the English in the East."

These we place before our readers without a word of comment, for as we are not seated in *la chaise du critique*, our mouths are shut as to whether we agree or disagree with our author.

We heartily congratulate Dr. Boggs on the Foreign Honours he has attained, and trust that he will be permitted to enjoy and adorn them through a long, useful and prosperous life.

Surgical Experiences: the substance of Clinical Lectures. By SAMUEL SOLLY, F.R.S., Senior Surgeon to Saint Thomas's Hospital: Member of the Council, and late Professor of Anatomy and Surgery in the Royal College of Surgeons of England, etc. London: Robert Hardwicke, 192, Piccadilly. 1865, 8vo. pp. 656.

MR. Solly's book is what it professes to be, a book of *surgical experiences.* It is indeed the substance, if not the ipsissima verba, of certain clinical lectures on Surgery, delivered at St. Thomas's Hospital from 1841 to 1865, by a well known and highly esteemed London Surgeon. It does not profess to deal with novelties, but to illustrate the principles of Surgery by cases as they actually occur.

It is a book on which the Surgeon in actual practice, who can discern the difficulties and disappointments that occur in his daily career, as well as appreciate the rewards of labor and anxiety,—the triumphs of his art,—is far more likely to bestow praise and attention, than the Tyro of the profession. Works of this sort, however, are the real storehouses of our knowledge. It is from these that systematic treatises are, in a great measure, compiled, and as such, we feel sure, that Mr. Solly's book will meet with a hearty welcome from those of our readers who may be engaged in the more active practice of Surgery. It is divided into fifty-four lectures, and embraces at least thirty different subjects. It will be impossible, therefore, to do more than glance at a few of these, as a critical review of so many different subjects would occupy more space than we can devote to the volume.

The first seven lectures are devoted to Diseases of the Spine. The first lecture deals with its lateral curvatures—those distortions so prone to appear in young females of the better classes, whose health has been undermined by confinement, and whose frames are weakened and arrested in development by the usages and restrictions of civilized life, and by impaired nutrition. It deals with them, clearly and practically, pointing out their origin and causes, the principles of their treatment, and the means of prevention. In the 7th lecture the author refers to an antero-posterior curvature of the same genus and arising from the same causes;—a curve of feebleness not of disease—the aggravated stoop occasion-

ally met with, though little noticed in surgical treatises. Mr. Solly only details one case, a child of 9 months old, regarding whom he was consulted. There was curvature of the dorsal vertebræ, indications of pain elicited by tapping on either side of the projection of the spine, and loss of power over the lower limbs, though there was no paralysis of the sphincter ani or bladder. The history and appearance of the child, the pain from pressure on the curvature, all pointed to the conclusion that there was disease of the bodies of one or more vertebræ, and that the child was doomed to be a hunchback for life. Further examination showed that the case was not one of true angular curvature, but an exaggerated stoop or curved back without carious disease of the bodies, but in all probability with a partial absorption of them. Perfect rest was enforced on the trunk and lower limbs by a mechanical contrivance which prevented the spine bending forwards, and permitted to the neck and arms only freedom of motion.

Suitable constitutional remedies and a change to the sea side were prescribed, and in the course of a few months the spine was reported perfectly straight, and the child vigorous and remarkably well. It is a known fact that the solid bony structures yield to pressure more easily than do the elastic intervertebral substances; hence the habit of stooping from the back or "round shoulders," as it is sometimes called, is more deleterious and permanent than when the habit of stooping from the loins is acquired, as the anterior edges of the bodies of the dorsal vertebræ are prone to become absorbed, which, from the greater elasticity, is not the case in the lumbar region.

The 2nd lecture treats of Angular Curvature and Caries of the bodies of the Vertebræ as ordinarily met with. In it and the two subsequent lectures the author dwells on some points of great practical importance, namely, 1—The occasional commencement of the ulcerative process in the intervertebral cartilages instead of in the cancellated bony structure of the bodies; 2—The occurrence of caries of the spine with and without the formation of matter; 3—The occasional occurrence of lateral curvature from caries of the vertebræ.

It would appear that suppuration more frequently follows caries which commences primarily in the bodies of the vertebræ than that which commences in the intervening ligamentous tissue, and this is the important point as concerns

recovery; for, however much deformity or paralysis may excite pity and sympathy, it is the formation of abscesses that brings the patient to the grave.

Caries only attacks the anterior segment of the spine, for numerous though the small joints in the posterior segment be, they are scarcely ever seen in a state of caries. While that action is spreading to the bodies of the contiguous vertebræ, coagulable lymph is being deposited in the tissues that connect the vertebræ posteriorly. This in time becomes solidified and arrests motion, which favors any tendency there may be for the morbid action to subside, and for the absorption of abscesses of limited size. All Surgeons of experience in spinal disease recognise the fact that abscesses form in many cases without disclosing themselves externally. In two cases detailed by Brodie, abscess presented itself only at the end of eight years in one, and in the other, a case of dorsal caries, the time was not less than sixteen years. When we meet, therefore, with a case in which there has been no manifestation of abscess, we are not justified in concluding that one has not existed. "The inference ought rather to be," as Mr. Shaw (Holmes, vol. iii. p. 842,) remarks "that an abscess has really been formed; but that it has been held in subjection, and prevented from developing to a large size by the processes of resolution, which have eventually led to its perfect removal." What are those cases in which abscess will not develope to a large size and terminate in resolution? Brodie says, "in a case of scrofulous caries of the spine, I doubt whether the patient ever escapes abscess." The immunity from suppurations of patients suffering from *rheumatic* inflammations is as proverbial as is the tendency of the *scrofulous* inflammations to suppurate. This really seems to be the crowning point in the prognosis of such cases. If the inflammation is scrofulous, it will terminate in suppuration in the body of a vertebra, as elsewhere. If its nature be not scrofulous, the inflammation, if properly managed, will not necessarily eventuate in abscess, but may terminate in resolution.

Sir Benjamin Brodie pointed out long ago, that the bodies of as many as three vertebræ may be completely destroyed, and disease of the spine be present for many years, without matter having formed. He believed that this form of caries may be frequently referred to chronic rheumatic inflammation affecting the bones and inter-ver-

tebral cartilage, and Mr. Solly adopts the title of *Rheumatic Caries of Brodie* for this form. Mr. Solly says :—

"If it is important for you to distinguish between lateral curvature and angular curvature, so it is even still more important that you should distinguish between ordinary or *strumous* caries of the spine, and the *rheumatic* caries of Sir B. Brodie—for I am convinced that the two diseases are essentially different, both as regards their origin, progress, and termination, and the treatment required for their cure—and again, between the latter, and disease of the cord independent of disease of the bone. Sir Benjamin Brodie, in a lecture published in the *Lancet* of the 30th December 1843, has remarked that rheumatic caries is always accompanied with pain ; scrofulous caries, though frequently, not so invariably ; and in paraplegia from disease of the cord independent of disease of the vertebræ, there is an entire absence of pain. The history of each case will also assist you—the presence or absence of a rheumatic or of a scrofulous diathesis—the moral history of your patient, independent of disease of the cord being generally the result of excess in venery by persons leading sedentary lives and engaged in continual mental exertion. But in these last cases—and I have seen several—there is no pain on tapping the spine. But, on the other hand, there are cases of spinal disease in which the diagnosis is not so easy. The patient suffers severe pain on pressure over the spinous processes, with total loss of power of the legs, but without any irregularity of the vertebræ, or other evidence of the existence of disease of the bones. The most anomalous symptoms, however, generally occur in females; and where we find, in our examination of these cases that there is no evidence of a rheumatic tendency previously, that they have never suffered from rheumatic pains, and that the tenderness on pressure is not confined definitively to any particular portion of the spine, severe pressure, not inflicting more pain than slight; again, the pain shifting sometimes in one portion of the spine, sometimes in another; and, if in addition to this, you find clear signs of a hysterical diathesis, you may generally refer such ailment to a hysterical origin." p. 48.

Lectures V. and VI. are devoted to affections of the Spine more obscure in their diagnosis and more insidious in their progress, commencing in the ligaments, sometimes induced by cold, sometimes by direct injury, such as a sprain, blow or fall. The cases are somewhat too diversified to give even an epitome of them in such a short notice as this, but they are well worthy of perusal.

Injuries of the Spine and of the Head are treated of in subsequent lectures, and will also well repay a careful perusal; but we cannot enter upon the subject here as it is both extensive and interesting, and its full review would occupy

more space than can be given to the "Surgical Experiences" altogether. We make, however, no apology for placing shortly before our readers Mr. Solly's description of the Scrivener's Palsy, or the Paralysis of Writers—a rare disease of the nervous system, not described in any English system of Medicine or Surgery that we are aware of, though referred to by several continental writers.

"The disease, as its name implies, shows itself outwardly in a palsy of the writing powers. The muscles cease to obey the mandates of the will. It comes on very insidiously, the first indication often being only a painful feeling in the thumb or forefinger of the writing hand, accompanied with some stiffness; these unnatural sensations subsiding during the hours of rest and sleep, to return with the writer's work on the next day.

"The loss of power is not sudden, as in a paralytic stroke; nor is it a complete paralysis of any group of muscles. The paralyzed scrivener, though he cannot write, can amuse himself in his garden, can shoot, and cut his meat like a Christian at the dinner table: indeed, he can do almost any thing he likes except earn his daily bread as a scribbler."

Scrivener's palsy is not a paralysis of any set of muscles, for the patient can make all his muscles act; but he cannot bring them all into such harmonious action as to be able to write. The act of writing is dependent on the co-ordination of several muscles. The cerebellum is the great co-ordinator of motion—but Schroeder Van der Kolk has shown that the spinal cord is a co-ordinator of movements of the body by its motor cells or vesicles—and Mr. Solly holds to the view that the scrivener's palsy has its seat in the spinal cord, from the facts that in most cases pain is felt in the lower part of the cervical and upper part of the dorsal regions, while there is seldom any pain complained of in the head, and "that the use of the left hand in writing instead of the right will induce uncomfortable feelings in the latter." Mr. Solly is of opinion that the disease depends on granular degeneration of some of the ganglionic cells of the spinal cord in the region of the brachial enlargement, but this opinion is as yet unsupported by post-mortem examinations of any of his own patients.

Complete rest from the occupation that has produced the disease seems the only remedy of any use.

"Fresh bracing air—mountain air if attainable—is of more service than all the tonics in the world. As regards tonics, they must be varied

to suit the peculiarities of each constitution. Zinc, iron and quinine are the tonics on which I rely most."

This is not the only instance of a set of muscles losing their consentaniety of action by long continued over-exertion. Continental writers have recognized the sempstresses', shoemakers', milking', musicians' and compositors' cramp.

Diseases and Injuries of Joints with Disease of Bone occupy 177 pages of the volume. There is some attempt at arrangement in these lectures, but it might have been carried further with great advantage, for facility of reference; diseases of the knee joint, for instance, being the subject matter of lectures 25 and 26, and of 32 and 33, while the intervening lectures are devoted to other matter.

The subject of diseased joints is fully dealt with. Speaking of hip-joint disease, our author says :—

"I consider this lengthening—though as I have already said, it is more apparent than real—important as a diagnostic of the acute and active stage of the disease.

"It is only in this stage that I have found any local depletion of service : for as a general rule, and certainly in the more advanced stages, leeches, and other means of local blood-letting, only do harm by weakning the powers of the patient. It is in this stage that absolute rest is so important, and that calomel and opium are of real use.

"Pressure of one articulating surface against the other does not much affect the patient, unless there is ulceration of the cartilages : and therefore this manœuvre is often a means of diagnosing this additional mischief. The mere pushing the os femoris directly into the acetaculum will not always give rise to pain, even if there is ulceration : but by giving the thigh a rotation inwards, thus jerking the bone against the inner side of the cotyloid cup, you can generally detect any increase of disease beyond mere synovitis.

"After the disease has existed for some time, the rotundity of the buttock is lost, and the edge of the glutæus muscle no longer stands out in bold relief, the fissure separating the nates from the thigh almost disappears, and the line becomes more oblique. These changes all depend on the wasting of the muscles from disuse, consequent on the state of the joint admitting of but little motion.

"The patient often complains of pain in the knee, referring it to the inner side. This pain has usually been considered sympathetic, and I believe that it generally is so, but M. Bonnet * * considers 'that the pain arises from actual disease in that joint.' * *

"In the case of E. C. there was unequivocal shortening of the

limb, so much so, that she required a sole to her shoe of at least four inches to enable her to walk at all evenly. Now whence this shortening? If we look at the head of the bone we find its convexity diminished: but that is all. If we look to the neck we find it very nearly the ordinary length in a female of her stature. No absorption of its exterior has taken place, the obliquity also is normal. It has not assumed the horizontal line which shortens the limb in old age. The explanation is simple and rests upon a very important law in the economy—namely, that the development of every part of the living organism which is not normally employed during growth is more or less arrested: and I feel no hesitation in saying, that if the diseased thigh-bone had been compared with its fellow on the opposite side, a considerable difference would have been discovered in the length, size and height of the two bones.

"In some cases of this disease, as you may see in one of my patients now in the hospital, the os femoris is actually dislocated and the head of the bone lies on the dorsum of the ilium. In such cases there is no doubt regarding the shortening; but there are cases in which there is apparent dislocation, and the signs of which have been so distinct in the opinion of the attending Surgeons, that they have felt no doubt on the subject, but in whom a post-mortem examination has proved that there was no displacemont whatever.

"But these observations must not lead you to suppose that, in all cases of disease of the hip joint, the shortening of the limb can be thus accounted for, or that there is a positive shortening of the lim b in all cases of this disease.

"We have already seen that one of the characteristics of *morbus coxæ* is, that the thigh is flexed upon the pelvis, so that the toe can only just reach the ground; and so far the limb is shortened. It is a point of some importance, and it is one on which much has been written, to ascertain whether the limb is really or only apparently shortened: and there are other cases in which the head and neck of the bone are removed under the action of carious absorption. Here, again, there can be no doubt the shortening is real. But in the greater number of cases the shortening is only apparent, not real. It arises from the alteration in the position of the pelvis from lateral curvature of the lumbar vertebræ; and if this curvature has not existed so long as to have become permanent, the error may be detected by placing the pelvis of the patient when in bed, at its proper right angle to the spine, and then, if the diseased joint will permit the extention of the thigh, placing the limbs parallel. If it cannot be accomplished in this way, accurate measurement from the ant: sup: spinous process of the ilium to the patella and thence to the sole of the foot under the ankle will generally decide the question."

In his lecture on disease of the knee-joint, Mr. Solly professes himself a convert to excision in suitable cases.

"When this operation was reintroduced by Mr. Ferguson in 1830, I confess I was very incredulous as to its value. I thought that those cases that would be cured by excision might be cured without it. I had had, as you have heard me say before, several cases of apparently hopeless disease of this joint, arrested by the repeated use of the moxa externally and cod liver oil within; a good firm anchylosis being the result. On the other hand I have had cases of ulceration of the cartilages which have been carried off by phthisis during the progress of a local cure. But we have yet no proof that either excision or amputation would have averted such an untoward result.

"The facts, however, that have converted me to the belief that excision of the knee-joint is not merely admissible in many cases, but that it is decidedly desirable, are—first, the time occupied in obtaining a perfect cure by anchylosis, which ranges from two to four years in all adults; secondly, that even in the most favorable cases there is great tendency to a recurrence of the disease: and, thirdly, that the statistics of the cases already published show that the operation is not so fatal as amputation of the thigh."

Mr. Solly is decidedly a conservative Surgeon; he desires the scalpel and gouge to take the place of the knife and saw as far as possible: indeed he states that he has only amputated the thigh twice for disease during his incumbency at St Thomas'. With these views we are rather astonished to find him amputate the leg for disease of the ankle-joint in preference to Syme's amputation at the ankle-joint, which gives so useful a stump and enables the patient to dispense with a wooden leg. He points out, it is true, that disease of the ankle is often situated in the calcaneo-astragaloid joint, and for such he recommends the use of the gouge, and gives more than one successful removal of the disease, a useful foot being retained. We quite agree with him, but where the disease is situate in the tibio-tarsal joint, there can be no necessity, in ninety-nine out of every one hundred cases, for amputation of the leg.

The volume is very rich in material for the reviewer, but the multiplicity of matter makes it difficult to select from. We see we have marked several paragraphs, the subject of which we cannot even hope to touch upon; but we cannot avoid referring to the excellent lecture on Partial Amputation of the Hand, from its very general application to all members of the profession. Few men, however little inclined for operative interference, can pass through a professional career without being called upon to deal with a crushed hand, and on the discretion of their dealing with it will depend the usefulness or otherwise of the remnant of the member. A crush-

ed limb necessitates amputation to save life, as the physical suffering and constitutional irritation involved in the separation of the crushed part by mortification would destroy life; but:—

"The same character of injury to a large limb, which necessitates amputation, does not do so in a smaller one, such as the fingers, thumb, or even a portion of the hand itself.

"For instance, suppose in one of those crushing injuries of the hand, whether by machinery or by the force of gunpowder and shot, the thumb is wrenched out of its joint, with the carpus and all the muscles of the ball of the thumb torn through, but not quite detached, still united by some skin and cellular tissue, and the dorsal arteries intact, you ought not to remove the thumb with your knife but you should re-place it in its normal position and thus try to save it. If you fail and gangrene ensues, your patient is no worse; if you succeed, your patient retains a useful hand, though all his fingers may have been carried to the winds. It is astonishing how well these cases do, even when the connecting medium left seems to be little more than a narrow piece of dirty lacerated skin."

In a partial amputation of the hand rendered necessary by an injury, we were able to save, on one occasion, only the little finger, the thumb and all the others having been removed, but a more useful organ, resulted than any mechanism ingenuity could construct. A portion of the thumb and a portion of any of the fingers, if they can be saved together, constitutes an organ of prehension which may be imitated, but which the surgical mechanic cannot by any means equal.

There are three lectures on Stricture of the Urethra, replete with instruction, setting forth the evils attendant on neglected stricture when relief is sought of the Surgeon,—perineal abscess and fistula, extravasation and retention. Mr. Solly is very partial to the thread catgut bougie in very narrow strictures, and we extract his remarks on the first case of stricture narrated in the book, as they exhibit his views regarding the treatment of such cases:—

"After enquiring what had been done, and finding that he had lost a good deal of blood in the attempts made to pass a bougie,—that no instrument had been passed and that there was a false passage,—I took a moderate-sized sound, and, passing it gently down the urethra, found that there was some spasm but not a great deal. Waiting a little I moved it onward again, till I found it absolutely stopped. After removing it I took a small catgut bougie, and passing it gently down, soon found it quitting the natural channel and entering a false passage. Having now ascertained the direction in which the passage ran, I then withdrew the bougie, and gave the point a slight

bend, and passing it in again, feeling round the urethra for the pervious spot, but avoiding the false passage, I managed to hit it off, so the instrument slipped into the bladder without using the least pressure or force.

"This is the great secret in the use of the thread-sized catgut bougie: it must be handled most delicately, turned in the urethra something like a cork-screw, till the hole through which the urine escapes from the bladder is pitched upon: and this is immediately felt by the instrument passing forwards without any sensation of obstruction. The catgut bougie must never be used with the idea of breaking down a stricture or pushing throught it, but, if I may so express it, coaxing it into the bladder. Whenever you find the bougie spring back, you must stop and give it a little twirl between your fore finger and thumb; you may often have to work for half an hour or more in this way, without being able to hit off the opening; but patience and delicate handling will do a great deal. I assure you it is worth taking some trouble to relieve a fellow-creature effectually of such a serious malady without the use of the knife. Having passed the stricture and entered the bladder, I desired that the bougie should be retained there for an hour. I attach great importance to the retention of the bougie; and with the catgut bougie there is this additional advantage that the bougie swells to twice its original size."

Latterly Mr. Solly has had gum elastic catheters constructed to fit on and pass over the catgut bougie, on the same principle as Mr. Wakley's instruments. When the stricture is so small that neither skill nor patience will overcome it with the aid of the bougie alone, Mr. Solly cuts through the perinæum, lays open the stricture, and passes on the catheter to the bladder.

We must now take leave of Mr. Solly's book although we might quote more largely much instructive matter from its pages. Mr. Solly almost apologizes for offering his Surgical Experiences in their present form, but English works detailing personal experience are much too scarce. The book will take a high place among works on Clinical Surgery, and it is very much to be desired that other Surgeons of great experience would follow Mr. Solly's example.

NOTE.—The Editor is indebted to the kindness of a friend for the above notice of Mr. Solly's *Surgical Experiences*. He feels that he has, probably, thus obtained a more thoroughly impartial review than might have been the case if it had been written by himself, formerly one of Mr. Solly's Dressers, as the reverence due to an honored Master sometimes leads to a pardonable bias in his favour.

PART III.

MEDICAL MISCELLANY.

No. 1.—*Case of Enormous Aneurism of the Thoracic Aorta, causing absorption of the bodies of several vertebræ, and proving suddenly fatal.* By W. Farquhar, M. D., Garrison Assistant Surgeon, Bangalore.

Coomarasawmy, aged 40, a horsekeeper, was admitted into the Civil Hospital, of which I was in temporary Medical charge, on the evening of 6th June 1865, complaining of much dyspnœa and palpitation. Had been dissipating and keeping late hours for two or three days back, while celebrating a festival.

When seen by me next morning, he was looking ill and anæmic, though his body was well covered with fat; the pulse was small, feeble and intermittent; the heart's action was excited, but otherwise normal. There was dullness over the whole of left side of chest, and the respiratory murmur was inaudible. About four hours after the above visit, he expired suddenly while changing his position on his cot.

Inspection.—Left pleural cavity filled with bloody serum and large clots of blood; left lung compressed.

A very large solid tumour, of a conical shape, with the base upwards, was seen to be attached to the left side of the vertebral column.

This proved to be an aneurism of the thoracic aorta, commencing about an inch below the arch, and extending the whole length of this division of the aorta. It was firmly attached to the bodies of the dorsal vertebræ, from the 4th to the 10th.

On removal by the knife, the bodies of the 4th, 5th, and 6th vertebræ were found almost entirely absorbed, while the intervertebral cartilages remained intact. The bodies of the

above vertebræ formed the posterior boundary of the tumour, the wall of the sac having been completely eroded, while at the same time, by its edges, it retained a firm attachment to the sides of the spinal column.

The aneurism was almost composed of coagulum, and there was a deposit here and there of osseous matter, on the inner surface. The blood had escaped from the depending portion of the tumour, which was attenuated and torn.

The heart was free from any disease or osseous deposit.

Remarks.—The very solid nature of this tumour, formed as it was of gradually deposited concentric layers, showed that nature had long striven to avert a fatal issue.

Since the above case, my attention has been attracted to the frequency of aneurism and other irregularities of the arterial system, and by keeping the possibility of the presence of such diseases prominently in view, I have succeeded in detecting them, where they might otherwise have passed unsuspected.

In October 1865, a pensioned soldier, engaged in trade, and addicted to drinking, incidentally spoke to me of severe pains which be referred to both clavicles, to which he had been applying iodine and other local remedies, under the impression that the pains were rheumatic. I asked to see the parts, and I immediately detected a prominence of each sterno-clavicular joint. On applying my hand to each tumour pulsation was very distinctly felt, and there was a strong thrilling sensation communicated when the finger was applied to either subclavian artery. From the very yielding nature of the tumour, it was apparent that little or no deposit had taken place within the sacs. The two swellings were very symmetrical, and both encroached on the lower aspect of each articulation. I at once forbad the use of any local remedies, and told this person that his only hope of prolonging his days lay in the leading of a quiet and sober life. I also prescribed the acetate of lead in 3 grain doses which he continued to take for some time. I saw him twice within a month, and at my second visit, the pains had disappeared, and the pulsation seemed, if any thing, less. In May of this year, I happened to see this person and was gratified to see that the swellings had made no progress. He vowed he had been living very temperately since I had frightened him by informing him of the nature of his complaint.

Another case came recently under my observation.

Mrs. L.—A native aged 37 years, wife of a European Pensioner, was admitted into the Garrison Hospital 12th February 1865, with symptoms of uterine and ovarian disease. She did not improve much under treatment, and she became very hysterical, fretful, and complaining. She stated that she had often suffered severely in her head, but her friends and her husband had looked upon her ailments as imaginary, and used to think she was mad. In Hospital, her complaints of pain, &c. were so changeable both as to nature and site, that it was difficult to imagine any thing but Hysteria to be the cause. A rapid emaciation and localization of what appeared to be excruciating pain, led to a strict examination of the thorax, and the discovery of an aneurismal tumour projecting slightly above the sternum. This swelling rapidly increased and she was found dead on the morning of 16th March, having discharged a large quantity of blood by the nose and mouth.

An *inspection* of the body revealed an aneurism of the arch of the aorta, and branches given off by it, of the size of an orange, and which had caused slight absorption of the upper part of sternum to which it was adherent. On the left side of the tumour there was nothing but the bare coats of the sac which had given way by a gradually contracting circular opening, which at last burst into the left bronchus by an aperture the size of a goose quill.

No. 2.—*A Case of Open Foramen Ovale, but not attended with Cyanosis, till two or three days previous to death.*

By W. Farquhar, M.D., Garrison Assistant Surgeon, Bangalore.

15*th April* 1866.—C. J., Gunner, Artillery Veteran Company, Ætat. 40 years, came into the Garrison Hospital last evening, complaining of great dyspnœa, which had been gradually increasing for some days. Was feeling very weak, and said that he got no sleep at night, and that he had lost his appetite. Complained also of a sensation of heat all over his body. Little or no cough.

This morning I find him sitting up in bed with an anxious and dusky countenance. His body is emaciated, and

his appearance generally is that of a person far advanced in Phthisis, under which heading he is admitted.

Has been in Bangalore for 20 months on private leave, but never presented at hospital before. Had been taking Cod-liver oil and stimulants outside, and was living in every way as generously as his means permitted.

Physical Examination.—The chest walls do not move freely, and pain is caused by a deep inspiration. Percussion elicits considerable resonance over all the thorax, except the right sub-clavicular region where there is dulness and cavernous respiration.

Moist râles are heard over the greater portion of right lung.

Respiration is more difficult than hurried; pulse strong, sharp, and full. No abnormal heart-sounds, but complaint is made of "a fluttering, sickening feeling" at the *scrobiculus cordis*, where a very rapid pumping sound is heard.

The finger nails are quite livid.

Ordered low and pudding diet, and one measure of brandy, also Æther. Chloric, ♏xx. three times a day.

Tinct. Iodinii to be applied to right sub-clavicular space.

16*th April.*—Much the same, had a little sleep towards morning.

On speaking of his history, he says he has always "been up to hard work," till about a year and a half ago. Dates his first illness back to about 1860, when he was nearly blown up in the great powder explosion at Secunderabad. Says that, from that time, he has "never been the same man," having received a very severe shock on the occasion. I find also that he has sustained the loss of his hard and soft palate. Denies having ever had syphilis, and says that this arose from an ulcer which grew larger and larger under the application of caustics.

Continue Omnia.

18*th April.*—Lying on his cot quite insensible; respiration stertorous; face and hands quite blue; pulse strong and full; cannot be roused. Had an attack similar to this last evening and rallied from it after some time. Had a measure of portwine last night, besides brandy.

Continue Omnia.

19*th April.*—Was found dead at ½ past 5 o'clock this

morning, in a natural attitude, with a hand under the pillow, and lying on one side. Was moving about yesterday in his usual state, and ate a good dinner.

Inspection seven hours after death. **Body** emaciated and rigid.

Thorax.—Slight adhesions of the pleuræ to sternum. Right lung adherent in several places; very firmly so at apex. Left lung not adherent. Two or three ounces of fluid in pericardium. Base of right lung adherent to diaphragm. A large vomica in apex of right lung, containing some dirty pus. The apex of this lung was so firmly adherent that it remained attached to the parietes. Both lungs were very much congested and densely studded with bloody points, the size of a pea, giving the cut surfaces a very mottled appearance.

Heart.—Larger than usual, and the walls a little thicker. Right ventricle full of coagula, easily removable with the exception of a clot which had a fibrinous appearance, and was rather difficult to detach.

In the place of the auricular septum there was a circular opening, nearly the whole diameter of the auricles; the edges of the little partition there was, were rounded and bore no marks of recent formation.

Remarks.—The history of this case would seem to point to the following as the most probable order of events; viz., that the great shock to which the patient referred his first illness, did really cause a rupture (perhaps slight) of the auricular septum; that so long as the patient was in health, the currents of blood maintained their separate courses; that failing health and a gradual increase of the abnormal opening of the *septum auriculare,* led to a carbonization of the blood, in time leading to congestion, inflammation, and suppuration in the lungs, and possibly causing the ulcerative action in the roof of the mouth. That absorption of pus from the lung abscess took place, and led to the formation of a fibrinous clot in the right ventricle of the heart.

That this embolism (for as such I look upon it) was sufficient to disturb the equilibrium of the circulation in the heart, and so cause an intermingling of the currents of blood, and consequent Cyanosis.

That such an order of occurrences as I have ventured to suggest, is not only possible but probable, may readily be

seen by a reference to the chapter on Cyanosis, in "Walshe's Diseases of the Lungs and Heart." In the *Medical Times and Gazette,* vol. i. for 1860, p. 459, there occurs a case where the foramen ovale was found *completely* open after death, and where, during life, there was nothing but an occasional duskiness of countenance to point to such a lesion.

No. 3.—*A Case of Hydrophobia.* By W. FARQUHAR, M.D., Garrison Assistant Surgeon, Bangalore.

10*th November* 1865: 6½ P. M.—Assistant Apothecary Smith was called to see P. H., Private, Queen's Pension Establishment, aged 45 years, a powerfully-built man, reported to be seriously ill from a feeling of suffocation and inability to speak, for which he and his friends could in no way account.

Had been ailing two or three days of soreness of throat, with pains about the shoulders and chest, and uneasiness of breathing, with disinclination for, and shrinking from, liquids. Had not slept for three or four nights. This morning he had been advised to take some Morrison's pills. Mr. Smith found him sitting on his cot, held by his wife. Breathing was performed hurriedly, and he looked about fearfully as if in dread of something. Mr. Smith having seen several cases of Hydrophobia, recognized the disease and enquired if he had been bitten by any dog. His wife stated that he had been bitten two months before by a dog supposed to be mad, and on account of which he was attempting to force some medicine down the dog's throat. He was in the habit of rearing dogs for sale. The wife had also been bitten at the same time. He was brought to Hospital about 7½ P. M. On getting out of the carriage, which he had carefully shut against draughts, he rushed into the ward and hid himself behind the folding-screen. He then lay quietly down, without speaking. He appeared quite conscious of what was going on.

On being made acquainted with the case, Dr. Rogers, Garrison Surgeon, and I, went over to see the patient. On approaching him, he started up from his cot, suddenly, towards me. He seemed in great distress, and when asked whether he was in pain, he energetically and repeatedly struck his throat with the back of his hand, and hurriedly

indicated the seat of uneasiness by running his hand along both upper extremities and around the thorax on a line with the mammæ. He could not articulate properly, but nodded assent to any question, and kept gulping the air, as it were, by fits and starts.

He muttered something about his inability to swallow water, and was rather violent in his gestures when doing so, and pointed steadily to his throat. The mouth was now and again elongated by the drawing in of the corners.

At intervals, the countenance was natural, though, for the most part, the features moved convulsively, the mouth especially working constantly. Occasionally he beat his chest and abdomen sharply with his closed fist. The thumb nail of right hand was seen to be wanting; it came off some time after the bite. No tenderness of thumb, but the end of the phalanx was prominently pointed.

Pulse 120; tongue moist, with a slight whitish fur; the roof of the mouth and the fauces were covered with a loose whitish coating. He complained of a burning in the back of the throat and in the eyes.

Ordered Calomel ʒss. and Ext. Cannabis Indica gr. ii.
To be made into 4 pills.

These were swallowed with some difficulty.

Ice to be sent for immediately.

10 P. M.—Ice had fortunately been procured, and it was now applied to the nape of the neck.

The good effect of this was almost immediate, as he at once began to talk freely and without stuttering or much hesitation.

He was most profuse in his expressions of gratitude for the comfort he was receiving, and before 10 minutes had elapsed, he, of his own accord, said that the uneasy and burning sensations in the throat were "going away."

The ice was then mixed with salt and put into two bladders, and kept on the neck and between the shoulders. So marked was the beneficial action of the ice, that it was determined to omit any further remedies so long as the symptoms did not increase.

12 P. M.—Beginning to get more restless; slaps his abdomen, chest and mouth, very frequently, saying there is "a fire in my belly and my eyes." Gets up now and again and clutches

convulsively at any thing. Does not like the ice so much, and fresh application of it seems to take away his breath.

Acet. Mylabris is painted along the course of the spine.

12½ A. M.—Ol. Crotonis ♏ iv. in yolk of egg, were given.

1½ A. M.—Is doing his best to swallow some bread, which he dips in water to moisten it.

Hot coffee is ordered for this purpose. The pulse is 156, and feebler than before. The surface also is colder.

2 A. M.—Continues to eat bread in small quantities, dipped in coffee and wine.

Passed a loose fæculent motion. Will not have more ice applied to neck.

His sensations of distress are now mostly referred to the abdomen, where he feels there is "something to come up."

Repeat Cannabis and Calomel pills for which he is clamorous.

Ice to be applied intermittingly to abdomen.

4 A. M.—On trying to swallow some wine he was nearly suffocated, and sprang off the ground.

5 A. M.—Has been several times on the stool, passing small quantities of fæculence. Says his head now is on fire, and begs it be blistered and to have ice applied, which latter is done. Cannot rest in one position. Hand constantly slapping the belly. No reference to throat. Is feeling sick at stomach.

6 A. M.—Asked for and swallowed some thick conjee with a spoon, but would not drink it.

7½ A. M.—There is a temporary lull in his aversion for liquids. Altogether he looks so promising that I leave him for a time. Ordered to get a soft boiled egg frequently.

11 A. M.—The Apothecary writes that he is worse, that his breathing is more hurried, that he has burning sensations all over the body, which, he says, catch his breath. Avoids talking, and requests he may not be spoken to. His pulse is 144; spasms frequent; face dusky.

¼ *to* 12.—Find patient clutching both sides of his cot with his hands; eye-balls rolling about wildly; countenance livid; features incessantly in motion, as if he were trying to chew something sticking in the teeth. Frequent movements as if about to vomit. Sometimes a little wind is expelled, but

gives no relief, and every now and again a fearfully severe fit of dyspnœa comes on and is succeeded by violent efforts to cough or hawk up something sticking in the throat. On two or three occasions a very tough ball of mucus was forcibly ejected from the mouth.

The whole expression of face is indicative of the most extreme anguish. Body covered by cold perspiration; pulse 140, less in force. When taking food, which he can now only do with a tea-spoon, he prepares himself as if for some desperate effort, and convulsively snatches each spoonful and tries to facilitate the descent by violently rubbing down and beating his throat which is very red from this usage. Is getting very sensitive to the slightest draught, and shouts madly whenever he fancies an air of wind strikes him, though all the doors and windows are closed. When he hawks up any mucus, he says "it smells like stinking cabbage or rotten eggs."

Ordered Ext. Cannabis Indicæ gr. vi.
P. Ipecac. ʒss. to be made into boluses and chewed.

¼ *to* 1 P. M.—Pulse 156; duskiness increasing; is incessantly talking and always on religious subjects. No vomiting. The paroxysms of suffocative breathing are getting more and more frequent. To give some relief 10 grains of Morph. Hydrochloras were sprinkled on the raw surface on nape of neck.

Within ten minutes of this application he became so much quieter and easier, that I could not help attributing this to the narcotic action of the same; and as it was only given to afford relief, even at some hazard, I wiped off the remainder of the Morphia with a sponge.

2 P. M.—Is sinking fast. Face and whole surface livid; pulse flagging; respiration, slow and laboured; paroxysms very slight; is now quite unconscious and cannot be roused. Artificial respiration had the effect apparently of retarding the fatal issue. He continued in the above state till 20 minutes to 3 P. M. when he expired without a struggle.

Inspection—18 hours after death.

Cranium.—Dura mater adherent to left hemisphere of cerebrum on the upper surface adjoining the falx cerebri, throughout nearly whole length, for an inch in width. These adhesions were firm, and evidently of long standing. (I mention here that his wife said he had suffered from sunstroke

some years before). White substance of both hemispheres studded with red points. In left lateral ventricle there was ℥ i. of fluid—none in right. Large veins at base of brain empty.

Cerebellum, quite normal. No traces of the products of recent inflammatory action here or in any part of brain.

Spinal Cord as far down as fifth dorsal vertebra, perfectly healthy to the eye. No redness or injection of theca vertebralis or pia mater. Cord of normal consistence. No fluid.

Interior of Larynx and Œsophagus normal. Only in the former the mucous membrane had a dull, brownish appearance.

Time and other circumstances forbade a further examination of the cavities of the body.

Remarks.—The long incubation of the disease in this instance, recalls vividly to my recollection a similar case which came under my observation, when a student, 15 or 16 years ago. As a clinical clerk, I was present in the Ward on the admission of an intelligent farm servant, who had been urged to come to Hospital by the Parish Minister, in order to have something done for two or three trifling, painful sores which had re-opened on the left arm. These he stated to have been caused three months before, by the bite of a dog, which was not suspected, however, of being mad. The man treated the affair as trifling, but the injudicious manner in which the clergyman had hinted at the possibility of his getting Hydrophobia, seemed to prey a little on his mind; but he had no symptom of the disease. Next morning Hydrophobia set in, and carried him off on the day following. He was kept, with slight intermissions, continuously under the influence of chloroform.

No. 4.—*Ovarian dropsy, eight years' duration; Ovariotomy: adhesions separated by the cautery, and pedicle ligatured and left in abdominal cavity; speedy recovery.* By W. H. HARRIS, M.D., Supt. Govt. Lying-in Hospital.

April 11*th,* 1866.—M.C., Æt. 23 years, an East Indian, 3 years married, presented herself at the Dispensary attached to the Lying-in Hospital, with a large abdominal tumour

having all the characters of Ovarian disease of a partially cystic, and partially solid form.

Present state.—The tumour is irregular in shape, and seems to consist of a number of cysts and of a solid portion, united into one large mass. Fluctuation is distinct on the right side of the abdomen but on the left there is none, and this portion of the tumour is dense and appears solid, while in the median line above the umbilicus a depression exists, which feels hard and cartilaginous, like a large cicatrix. Some portions of the tumour are more prominent than others, and the irregularity of its general contour is considerable. The abdomen measures 11½ inches from the ensiform cartilage to the umbilicus, 6½ inches thence to the pubes, and is 40 inches in girth. Examination per vaginam discovers the tumour to be above the pelvic brim, the uterus occupies nearly its normal situation, but is a little more anterior than natural, and its cavity is not increased in length. Abdominal parieties can be moved pretty freely over the tumour, and the usual friction sound is thus distinctly produced. Some slight dyspnœa on exertion is complained of, but the general health is good, and the vital functions are not interfered with, to any appreciable extent, by the presence of the tumour.

History.—States that she first discovered the tumour upwards of eight years since. It then occupied the right side, and was as large as a child's head. Before this she had frequently suffered from pain in that situation, but had no idea from what cause it proceeded. The tumour has since slowly increased in size up to the present time, without any pause in its progress, but the enlargement was so gradual that it was only just perceptible from month to month. During the last year or two, the catamenia have been regular and normal, but before then, her "returns" were very irregular—sometimes suppressed for 6 months or so at a time—and usually very scanty and of short duration. She was under treatment four years ago for amenorrhœa, and, a year afterwards, she married, with the sanction of the Doctor, who, she states, said he saw no reason to prevent her, in the presence of the tumour.

To be under observation as an out-patient.

May 14*th.*—Was seen again to-day. Tumour more prominent in front, above umbilicus, and fluctuation is more

distinct and perceptible on both sides of the abdomen. Has been restless at night, and unable to lie down without getting dyspnœa; appetite and general health still pretty good.

Made an in-patient.

June 13th.—Since her admission, scarcely any change has taken place, except a slight increase in the size of the tumour, and a more distinct sense of fluctuation at all points. The abdomen measures 40½ inches in circumference, midway between umbilicus and ensiform cartilage, but the vertical measurement is the same. Deputy-Inspector General Porteous, and Surgeon J. L. Paul, having kindly examined the patient and concurred in the advisability of operating, and the patient having expressed an earnest desire of having the tumour removed at any risk, as her life had become a burden to her, I determined to extirpate the diseased ovary instead of tapping, as so large a portion appeared to be solid, and only very partial and temporary relief could be expected from the latter expedient. A delay of a fortnight, however, has occurred in consequence of the catamenial period being nearly due. It was passed five days since.

Operation.—The bowels having been cleared out by a dose of oil and an enema yesterday, and small pieces of ice given to her to suck for a couple of hours this morning, she was conducted at 7 A.M., into a spacious ward, where everything had been prepared for the occasion, and in which she was to remain after the operation. The floor of the ward had been sprinkled freely with water, and a vessel of water kept boiling in it to modify the dryness of the atmosphere. She was then placed on the end of an ordinary operating table, in front of a window, with her feet over the end supported by bandages to the legs of the table, and her body raised to a comfortable elevation by pillows. Chloroform was then administered by Assistant Surgeon Furnell, who, with Doctors Porteous, Paul, Cornish and Chipperfield, were kind enough to be present on the occasion, and as soon as she was fairly under the power of the anæsthetic, an incision four inches in length was made through the integument of the abdomen, in the median line, from the umbilicus to within two inches of the pubes. The structures beneath were then carefully dissected, and the peritoneum being exposed, was divided on a director. A very small quantity of ascitic fluid escaped, and with it a portion of the omentum, which was found completely overlying the anterior surface of the

tumour and adherent to it inferiorly. As far as could be ascertained, no adhesions existed between the omentum and abdominal parieties, on either side, but the left side of the tumour still seemed to consist of so much solid matter, that it was deemed impossible to extract it without enlarging the opening; and to save time and to remove the omentum out of the way with greater facility, the incision was extended upwards, on the left side of the umbilicus, for an inch and a half. The omentum was then carefully drawn on one side, and the glistening surface of the tumour fully exposed to view. A trocar and canula were plunged home a little on the right of the median line, and 15 to 20 pints of slightly brownish-yellow, puriform fluid withdrawn. A broad doubled piece of flannel was stretched over the abdomen close up to the rim of the canula, so that not a drop of fluid entered the abdominal cavity. When the flow had ceased, the adhesions between the omentum and surface of the cyst, which were numerous and rather extensive in some places, were cautiously divided by means of a cautery, which answered well in preventing hæmorrhage, though all of them contained vessels of pretty considerable size passing on to be distributed to the cyst wall. In one or two instances a ligature was required, for which purpose very fine silver wire was used, and the ends cut off short. The cyst which had greatly collapsed was then seized by a vulsellum, and turned out without difficulty, and it was found attached by a thin broad pedicle, extending from the insertion of the ligament of the left ovary into the uterus, for five or six inches outwards along the broad ligament on the left side, the left Fallopian tube being turned up in contact with the posterior surface of the cyst. The pedicle was so short and broad that a clamp could not have been applied without very great difficulty, and, as those at command were imperfectly constructed and not at all suitable or trust worthy, an attempt was made to divide the pedicle by the cautery, in the same manner as the adhesions had been separated, the cyst and the remainder of its contents being well raised up the while to take off all strain from the pedicle. A double piece of small whip-cord, however, first was passed through the thinnest portion of the pedicle, at its centre, as a safeguard, and the heated cautery then applied to the thin external edge of the attachment of the cyst. A large vessel almost immediately began to spout, and I deemed it advis-

able, under the circumstances, to abandon the cautery for want of a proper clamp, and to deligate the pedicle instead. This was done in three separate portions, and the whole of the pedicle was then encircled by an additional whip-cord ligature, close to the preceding. The cyst was cut away about half an inch from the ligature, and all the ends of the latter being cut off close, the pedicle was dropped *in situ* in the cavity. The left Fallopian tube was thus divided almost close to its junction with the uterus.

No hæmorrhage threatened from any of the points where the cautery had been used in separating the adhesions, and a few small coagula having been carefully removed with a sponge, the omentum was returned into the abdomen, and the wound closed as speedily as possible, by five deep and six superficial wire sutures. The former were inserted an inch apart, and nearly the same distance from the edge of the incision, and were carried across to the opposite side without transfixing the peritoneum. A compress of lint was laid on the wound and three long pieces of strapping over it to the sides of the abdomen, which was finally supported by a many tailed flannel bandage.

During the entire operation the intestines were not in the least brought into view. The pelvic organs alone were seen.

The fluid which had been drawn off and that which remained in the cyst, together weighed 24 lbs., and the solid part of the tumour 3 lbs. On examining the latter it was found to be of an irregular oval form, projecting in a somewhat sacculated manner in some parts, and depressed in others ; the structure of the parieties at the points corresponding with the depressions being thicker and of a more dense and tendinous nature than the other parts.

No vestige of smaller cysts, or of the ovary, could be seen externally, but on opening the cyst the ovary was found, six or eight times its natural size, attached to or imbedded in the inferior and inner side of the cyst wall, which seemed to spring from beneath it ; and several firm thick bands of fibrous tissue passed from the base of the ovary to the cyst wall on each side. The coat of the ovary was enormously thickened and on cutting into the substance of the mass, it was found to consist of a number of cysts, varying in size from a large pea to a hazel nut, filled with an opaque fluid and surrounded by degenerated fibrous tissue and granular matter.

The patient vomited slightly once or twice during the operation, but it did not become necessary to discontinue the chloroform until after the cyst had been removed. As the patient became rather depressed, however, a little brandy and water was administered at intervals during the closing of the wound, and she rallied well by the time the dressing was completed. Pulse then 108, weak. After being put to bed she was ordered to have hot water, in bottles, applied to the feet, and tincture opii. ♏ xxv with brandy ½oz. and a little cold water. The draught to be repeated in a couple of hours, or sooner if necessary, and broth to be given at intervals of three hours. Small pieces of ice to suck if there be any vomiting.

Vespere.—Vomited after taking any nourishment, but kept down the draught, and a pill composed of 1½ grs. of opium; still feels sick; has not slept at all, and seems rather restless; pulse 120, skin a little hot; complains of a weight and dragging in the lower part of the abdomen, and there is a little tenderness near the wound. Refuses the ice.

℞. Ammon. Carb. grs. xx.
Tinct. Opii. ♏ x.
Acid Hydrocyan. Dil. ♏ ii.
Aquæ puræ ℥ii. Mt. Ft. Haust.
℞. Acid Citric grs. xv.

Sign:—the effervescing draught to be taken every three hours.

To have broth or milk when sickness is allayed.

14*th.*—Slept a little through the night at intervals; still some little tenderness, but dragging, &c. less; pulse 100, small; skin cool and moist; tongue clean; sickness ceased.

Small stupes to be applied three times a day over the tender spots.

℞. Opii. gr. i. ter in die.
Custard, milk, and broth.
Omit. haust.

15*th.*—No pain or tenderness; pulse 94; skin and tongue natural; slept well and takes the nourishment.

16*th.*—Going on well. Deep sutures removed. Wound uniting by first intention.

19*th.*—Wound united; no unfavourable symptom.

21*st.*—Superficial sutures removed. Bowels not relieved

yet; had a warm water enema yesterday but without effect.

Rep. Enema aq. tepid.
Chicken diet.
Wine 3 oz.

26*th.*—Bowels have acted naturally after a dose of oil on 23rd. Wound quite healed. Patient walking about the ward.

30*th.*—Patient quite well and getting strength daily.

Remarks.—There are several points of interest in this case, I think, worthy of more than passing notice. First, the conditions of the tumour on external examination rendering the diagnosis imperfect, affords another illustration of the difficulty which is often experienced in determining the proximate characteristics in ovarian as well as other abdominal tumours. Next, the situation of the omentum, which covered the whole of the anterior surface of the cyst. Text books do not refer to the possibility of this occurring, and as far as I can remember without referring, I cannot call to mind a single case before of its being met with in front of the tumour. The omentum in this case was enormously elongated and hypertrophied, and if tapping had been performed, there would have been a great risk of wounding some of the large vessels with which it was liberally supplied. This must be regarded as an additional risk in tapping in all cases, but as it happens so seldom that the omentum intervenes between the parieties and the surface of the cyst, it cannot carry much weight as a reason for influencing our decision in respect to the mode of treatment to be pursued. Then, it may be interesting to the Pathologist to enquire as to the manner in which the ovary became in contact with the interior of the cyst wall. That it was actually external to the cavity of the cyst there can be no doubt, in the same way as the stomach and liver are external to the cavity of the peritoneum. The mode in which the change in its situation has come about is difficult to explain, but I am inclined to think that an intimate union has been contracted by the cyst wall to the proper coat of the ovary, at all points, under the combined influences of pressure and the changes effected by inflammation;—the former of these may have caused the cyst wall to be reflected over the ovary, and the latter, to be united to it and to the structures in its immediate vicinity. Lastly, I may

refer to the rapid healing of the wound and recovery of the patient. The cautery was freely used in separating the adhesions of the omentum, and the ligature of the pedicle consisting of four separate pieces of whip-cord, was cut off close and left in the cavity of the peritoneum. Both of these plans are comparatively recent and are opposed on very fair grounds; the objections being based on the supposition that the slough in the one case and the remains of the ligature itself in the other must act as foreign bodies, and, in all human probability, set up irritation, peritonitis, &c., and destroy the patient. In practice, however, these severe consequences have not resulted, and though sufficient experience may not have been gained by the cases recorded by Dr. Tyler Smith, Mr. Butcher, and others, for the general adoption of this mode of treating the pedicle in preference to others, its perfect success in this, as well as the other cases, should obtain for it a fair trial to save it from being condemned on theory.

NOTE.—We are glad to be in a position to state that this patient continues in good health. The catamenia returned this month (July) at the usual time, viz., on the 6th and ceased on the 10th.

No. 5.—*Four Cases of Stricture of the Urethra, successfully treated on the "immediate" method of Mr. Holt.* By Surgeon W. H. HARRIS, M. D., in Medical charge of the Madras Penitentiary.

CASE No. 1.—E. G. Soobiah, aged 30, a Comity, under sentence of imprisonment for 18 months, was admitted into hospital on the 21st February 1866, complaining of very great difficulty in voiding his urine in consequence of a stricture of long standing. The stricture followed an attack of gonorrhœa, and has existed for four and a half years; since that time, the stream has more and more diminished in size, and for some months past his urine has been passed almost *guttatim*. Great efforts are always required in micturating, and even then he seems quite unable to empty his bladder.

On attempting to introduce a catheter, a close stricture was found in the spongy portion of the urethra, about three inches from the meatus, extending an inch or more backwards. After considerable difficulty and perseverance, a No. 2 catheter was passed into the bladder, and 9 or 10 oz.

of urine drawn off, although the patient stated that he had passed urine only shortly before and thought he had emptied the bladder. The catheter was left in for an hour, and re-introduced on the 23rd. On the following days, Nos. 3 and 4 were successively passed, and on the 28th, No. 5 was got in. Then, withdrawing the catheter after it had remained a few minutes, I inserted Mr. Holt's instrument, and split up the stricture with a No. 5 dilator. A No. 8 catheter slipped in easily afterwards, and the patient was sent to bed and ordered a draught with 2 grs. of Quinine and 10 drops of Tincture of Opium every four hours.

Very little pain was caused by splitting the stricture, not nearly as much as by the introduction of the catheter on the first occasion, and it was only momentary. No rigor or other unfavourable symptom followed, and the draughts were omitted on the following day, when the patient was able to pass his urine in a full stream, and without much uneasiness. Only a little soreness was complained of. A No. 8 or No. 9 catheter was passed on alternate days for the first fortnight, and subsequently at progressively longer intervals, until the end of a month, when he was pronounced cured.

June 30th.—I passed a No. 8 catheter to-day with perfect ease; there seems to be no tendency to contraction as in cases where the stricture has been simply and gradually dilated, though it is quite three months since an instrument was last introduced.

CASE No. 2.—John Peters, aged 47, an East Indian convict, under sentence of seven years' transportation from the Straits, was admitted into Hospital on the 21st March 1866, for the purpose of undergoing the "immediate treatment" for a stricture of the urethra of five years' duration. Was under treatment a short time since for perineal abscess, from which he has suffered many times since the stricture first came on. There are cicatrices of perineal fistulæ, and one of these is still unclosed, but he states that the discharge from it is not very great. Urine is voided in a small forked stream. The stricture followed repeated attacks of gonorrhœa, for which he was treated only by native remedies.

A No. 5 catheter was tightly grasped by the stricture, which was situated about two inches from the meatus and extended more or less along the whole of the spongy portion, but I ultimately succeeded in passing the instrument into the bladder.

On withdrawing it, without drawing off any of the urine, Mr. Holt's instrument was introduced and the stricture split up with a No. 9 dilator. Very little pain was produced and a No. 9 catheter having been inserted in its place with ease, the urine was drawn off. Finally the patient was sent to bed and ordered draughts containing 2 grs. of Quinine and 10 drops of Laudanum every four hours. No unfavourable symptoms followed, and next day the urine was passed in a full stream, only a little soreness of the canal being complained of. No. 9 catheter was afterwards passed on alternate days for a fortnight, when the patient was discharged.

June 30th.—No. 9 catheter is passed with ease; patient states that he had a small swelling in the perineum after leaving Hospital, but it did not suppurate. As he was not sent back to Hospital it must have been of little importance, and the cause may have been latent before the splitting of the stricture.

Case No. 3.—Soobroya Karantha, aged 45, a Brahmin convict, under sentence of transportation for nine years, was admitted into Hospital on the 1st of April with stricture of the urethra of four years' duration. Urine passes *guttatim*, and he is complaining of loss of appetite, rheumatic pains and sleeplessness, which he ascribes as due to his difficulty of micturition, but which, considering his position, are more properly referrible to his prospect of speedy embarkation for the Andamans. The stricture followed a severe gonorrhœa, which continued for a year under treatment by native remedies, and was found to extend nearly the whole length of the urethra, from within an inch of the meatus through the spongy and membranous portions to within a short distance of the neck of the bladder. At one or two points it was cartilaginous, and throughout its extent almost impervious. Instruments of various sizes were tried in vain, for some time, until, after great perseverance, No. 2 catheter was gradually passed on through the contracted canal into the bladder. The man fainted as he stood during these repeated trials, and the instrument which was ultimately got in when he had been placed on his back was retained in the bladder for an hour. No. 3 was introduced next day, and on the following, No. 4. Then, on the withdrawal of No. 4 catheter I immediately passed Mr. Holt's instrument, and being satisfied that it was in the bladder, I inserted No. 7 "dilator" along the conducting cylinder through the

stricture, splitting it up. This was done while the patient was standing, and the pain, though sharp for the moment, was of such short duration that no syncope followed, as when the catheter was being passed on the first occasion. No. 8 catheter slipped in with ease, after withdrawal of the dilator, and the urine was drawn off. Quinine 2 grains and Laudanum 10 minims every four hours until next day, when, no bad symptom supervening, the medicine was discontinued. Patient could pass his urine in a full stream with very slight pain, and No 8 catheter was introduced daily until the man was discharged to be embarked for the Andamans four days afterwards.

CASE No. 4.—Narrainen, aged 28, under sentence of one month's imprisonment, was admitted into Hospital on the 18th May 1866, with a fistula in the anterior surface of the scrotum, and considerable enlargement and induration of the left testicle. States that he had gonorrhœa and syphilis more than a year ago, and immediately afterwards great pain and swelling of the left testicle, and an abscess in the situation of the present fistula. Passes his urine in a small forked stream, which he is very loathe to admit, fearing he may be operated on, but has never suffered from retention of urine, or been treated for stricture, or for the fistula, except by the application of dressings to the latter. On 21st, I ascertained the existence of a stricture, an inch and a half from the meatus of the urethra, and after much difficulty succeeded in passing a No. 2 catheter through it. Another stricture was then encountered an inch further down, extending through the membranous portion. At the triangular ligament it was impermeable, and I failed after repeated attempts to overcome it; and as some bleeding occurred, I desisted. On the 24th I again essayed to pass No. 2 or No. 1, but without being able to overcome the first stricture owing to the irritability and spasm of the urethra. I then tried with a larger instrument, and finally succeeded in passing No. 5. It required continuous and steady pressure for some minutes to get it through the membranous portion, but no force was employed. The catheter was retained for half an hour, and after its withdrawal Mr. Holt's instrument was inserted and No. 9 dilator employed. Much force was necessary to push the dilator home along the conducting cylinder, and the man, who is a very nervous subject, being taken by surprize, cried out lustily from the pain, but it passed off in a couple of minutes, and, after withdrawal of

the dilator, No. 9 catheter slipped in easily and the urine was drawn off.

Quinine and laudanum were given for twenty-four hours when, there having been no rigor or fever, the medicine was omitted. He could then pass his urine in a full stream, and no impediment was found next day in introducing No. 8 catheter. This was continued on alternate days, and on the 30th it is reported "No. 9 catheter passes easily." At the expiration of his sentence the fistula had almost entirely closed, and No. 9 could still be readily passed.

Remarks.—The great advantage which his method of treatment possesses over the former plan of gradual dilatation is sufficiently proved by the large number of cases reported by Mr. Holt himself, and by others, who have fully endorsed the almost universal success which he claims for the "immediate dilatation," or, more correctly, *splitting* of the stricture. The chief, if not the only reason, I believe, why it has not been more generally adopted in India, is, that it requires a special instrument for its performance; and it is impossible for Medical officers in this country, liable to be moved at a moment's notice from station to station, to supply themselves with every new invention which is favorably mentioned. This difficulty will now exist no longer in respect to this particular instrument, as it is procurable at the Medical stores, and the preceding cases may help to keep the new plan in view.

There is sufficient variety in the foregoing cases to show that this method is applicable to almost, if not to, every form of stricture which may be met with, when an instrument can be introduced at all. The effects, even compared with those sometimes following the simple introduction of a catheter, are almost *nil*, and the irritability and spasm, which may have existed before the operation, seem to be destroyed by it. The question still remains whether there will exist the same tendency to recurrence of stricture, as after gradual dilatation, incision, &c. A larger experience is probably required to decide this point, though, in two of the foregoing cases, a sufficient time has elapsed to augur well for the permanent success of Mr. Holt's method; but as at least temporary relief is afforded with such facility, and without danger, it is comparatively unimportant to determine if the cure be altogether permanent. Once effectually relieved, the patient can

always have recourse to the same means to prevent the stricture closing again to any inconvenient degree, and the occasional use of a catheter would probably obviate this necessity in all cases.

No. 6.—*Report of the Post-Mortem Examination of the body of a Woman brought to the Civil Dispensary, Berhampore, for examination as to the cause of death,* April 26th, 1866. By F. L. CLEMENTSON, ESQ., Surgeon-Major, 11th Regiment N. I.

THE post-mortem examination disclosed the following facts.

1. The body presented the appearances usual when decomposition has been going on for several hours, the fœtor arising from it was horrible, the features were so swelled and distorted that it would not have been easy for those who knew them best to recognize them ; the greater part of the body was, besides being greatly swollen, covered with bullæ.

2. On the table of the dead-house (where the examination was made) was a fœtus of from 4 to 5 months old, connected by the funis with the placenta which was still retained in the vagina. When the body was laid on the table, the fœtus was in utero, but had been expelled by the force of the gases evolved by the advancing decomposition.

3. Neither stomach nor bowels presented any sign of inflammation or of disease.

4. While removing the stomach and bowels in order that they might be forwarded to the Chemical Examiner at Madras, the end of a stick which had in some way escaped wounding the bowels was found lying close along the front of the spine and reaching nearly as high as the diaphragm.

5. On tracing the stick downwards it was found to have

penetrated and passed through the posterior wall of the uterus at its lower third; the end of the stick was in the upper part of the vagina.

6. The uterus was about 6 or 7 inches long from cervix to fundus, the walls and substance throughout were intensely inflamed, as were the appendages, connecting membranes and cellular tissue about these parts, which were moreover greatly infiltrated.

7. The stick found as above described was wound round with cloth, which no doubt was at the time of its introduction into the vagina and uterus covered with some irritating substance, which experience in this mode of inducing abortion had proved to be efficacious.

8. That the stick was introduced for the purpose of inducing abortion is, from the history of the case, beyond doubt. The woman had, it appears, borne a good character, but her husband had been away from her for three years, she had evidently had improper connexion with some person in his absence, and to cover her frailty, had resorted to some old woman reported to be skilful in procuring abortion; this old hag in pursuing her vocation had thrust the armed stick through the uterus instead of into its cavity, thus instead of destroying the child only, both mother and child were murdered.

No. 7.—*Report of Deaths in Madras, during the First Quarter of* 1866. By W. ARNOLD SMITH, M.D., Officiating Secretary, Sanitary Commission.

THE health of Madras during the first quarter has been on the whole satisfactory. The total number of deaths registered has been 2960, being a slight decrease of 21·1 on that for the corresponding quarters for ten past years, and a decrease of 284·6 for the past five years.

2. The striking difference in the comparison of the deaths of these two periods must be to a great extent attributable to the more accurate way in which the registration of

mortality has been latterly carried out—a fact noticed by Mr. Cornish in his Annual Report for 1861 ; and greater confidence is, therefore, to be placed on the contrasts drawn between the present Returns and those prepared since the year 1860.

3. Taking the population at 450,000, the mortality during the quarter would be at the rate of 26 per mille per annum.

4. Cholera has been far less prevalent during the quarter than it has been for some time past, there having been only 269 deaths from this disease against a mean of 636·6 for the same period for five previous years. During the last two weeks, the number of deaths registered have greatly increased, most of the cases occurring in Triplicane and its neighbourhood.

5. The total mortality from miasmatic disease has been 1542, being 382 deaths less than that for the same period for five years past.

6. The returns of mortality for 1865, which are now being compiled in the office, will also show a very low rate of mortality from miasmatic diseases as contrasted with five previous years; and from charts of mortality which have been constructed, it may be stated that the wave line of deaths from this cause only reaches the mean wave line at one point embracing a period of four consecutive weeks.

7. It cannot be doubted, that much of this decrease is due to many sanitary improvements which have been made in the town of Madras since the date on which these Returns were first compiled, which is an encouragement to further efforts of this kind; for much still remains to be done. The ground of many parts of the Native towns continues saturated with the contents of cess-pools and leaking drains, while poisonous emanations, which generate Typhus, Diarrhœa, Dysentery, and Cholera still abound. The Cooum river is still an open sewer, and teems with pestiferous exhalations and the germs of disease, and it may be safely said that, should an epidemic visit Madras, it will still find its population an unprepared and easy prey.

8. The total deaths from different classes of the population during the quarter are as follows :—

Deaths in Madras, First Quarter of 1866.

	Europeans.		East Indians.		Hindoos.		Mahomedans.		Total.		General total of both sexes.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Miasmatic Diseases.											
Small-pox	...	...	...	...	15	12	...	1	15	13	28
Measles	...	...	...	1	...	...	...	...	...	1	1
Fevers	1	...	1	2	236	251	17	33	255	286	541
Dysentery	...	3	1	...	163	123	22	25	186	151	337
Diarrhœa	1	...	2	7	113	121	12	11	128	139	267
Cholera	4	2	7	6	118	113	37	34	166	155	321
Total...	6	5	11	16	645	620	88	104	750	745	1495
Other Miasmatic diseases	1	..	...	...	15	6	2	2	18	8	26
Total of all other diseases	29	10	23	28	646	487	111	105	809	630	1439
Total...	36	15	34	44	1306	1113	201	211	1577	1383	2960
Mean mortality of ten 1st Quarters from 1856 to 1865.											
Miasmatic diseases	12·9	4·0	17·1	17·1	731·4	661·4	123·2	137·4	884·6	819·9	1704·5
Other diseases	15·6	4·9	17·7	21·4	540·1	481·3	99·2	96·4	672·6	604·0	1276·6
Total...	28·5	8·9	34·8	38·5	1271·5	1142·7	222·4	233·8	1557·2	1423·9	2981·1
Increase or Decrease.											
Increase	13·6		4·7		4·8		...		...		...
Decrease...	...		..		...		44·2		...		21·1

Two Charts accompany this Report; one showing the increment and decrement in mortality from certain diseases of the Miasmatic class, whose origin may perhaps be traced to effects of locality and climate; and the other representing the meteorological condition of Madras for the past quarter—those climatic elements only being exhibited which more probably influence the health of the community. These charts, being constructed in the same form, offer facilities for comparing the mortality with changes of climate, which no figures, however plainly shown, could ever possibly do.

A reference to the Mortality Chart shows, at a glance, the following facts:—

1st.—Throughout the quarter, with the exception of the two last weeks, there has been a marked decrease in the amount of Miasmatic disease, the rise during the two last weeks being due to an increase in the number of cases of Cholera.

2nd.—The number of deaths from Fevers, Diarrhœa, and Dysentery has been above the usual average; but a marked rise took place in all at a period extending over the fifth and sixth weeks.

3rd.—That Small-pox shows a marked decrease on the average number of deaths from this disease for the past five years.

4th.—That, although Madras has never been free from Cholera during the past quarter, yet the mortality from it has been far less than usual for 11 out of the 13 weeks. During the last fortnight a sudden rise has taken place.

A reference to the Meteorological Chart shows—

1st.—That the average atmospheric pressure has been the same as usual, but exhibits a sudden decrease in the 5th and 13th week, the former period corresponding to a change in the wind from N. E. to S. E.

2nd.—That the wind for the 1st, 2nd, 3rd, and 4th weeks has blown from a North-easterly quarter, and after this from a South-easterly one, its velocity being below the usual average for the quarter.

3rd.—That the temperature has been greater than the average during the quarter, more especially during the 5th and 6th weeks.

4th.—That the amount of humidity has been less than the average.

5th.—That the rain fall is below the average.

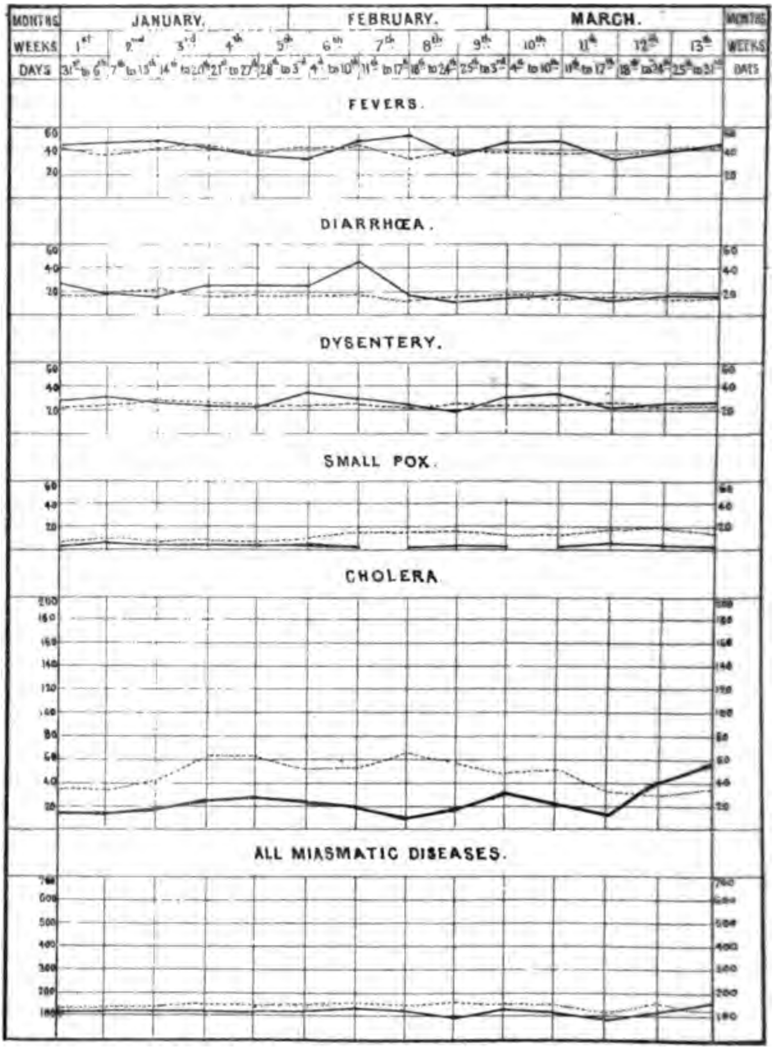
In contrasting the mortality and meteorological charts, nothing very particular can be traced between the wave line of deaths and climate till the 5th week, when certain marked meteorological changes occur, viz., the wind passes from a North-easterly to a South-easterly direction, with a marked decrease in atmospheric pressure, and a sudden ascent in the temperature. At this period a rise takes place in the deaths from Fevers, Diarrhœa and Dysentery, which continues through the following week and falls with a decrease in the temperature.

No connection can be traced between the wave line of Cholera and any meteorological element, but it is worthy of remark that at the time the mortality increased during the fifth week from Fevers, Dysentery and Diarrhœa, a steady decrease took place in the deaths from this disease. The Cholera Commission in Bengal notice that when Cholera is at its minimum, the number of deaths from Dysentery and Diarrhœa amongst Europeans reaches its maximum, and that at these times the deaths from all diseases amongst Natives also reached their maximum.

In pointing out these facts, it should be stated that no conclusions drawn from them can have any decided foundation until comparisons between climate and disease have been extended over a series of years. Up to the present time this subject has been almost entirely neglected in India. In forwarding the report of deaths in Madras for 1865, it is intended to show the wave line of mortality from the same miasmatic diseases for the six past years, as contrasted with meteorological causes, should such a plan meet with the approval of Government.

[redacted]

DIAGRAM SHOWING THE MORTALITY FROM MIASMATIC DISEASE IN MADRAS,
DURING THE 1ST QUARTER_ 1866.

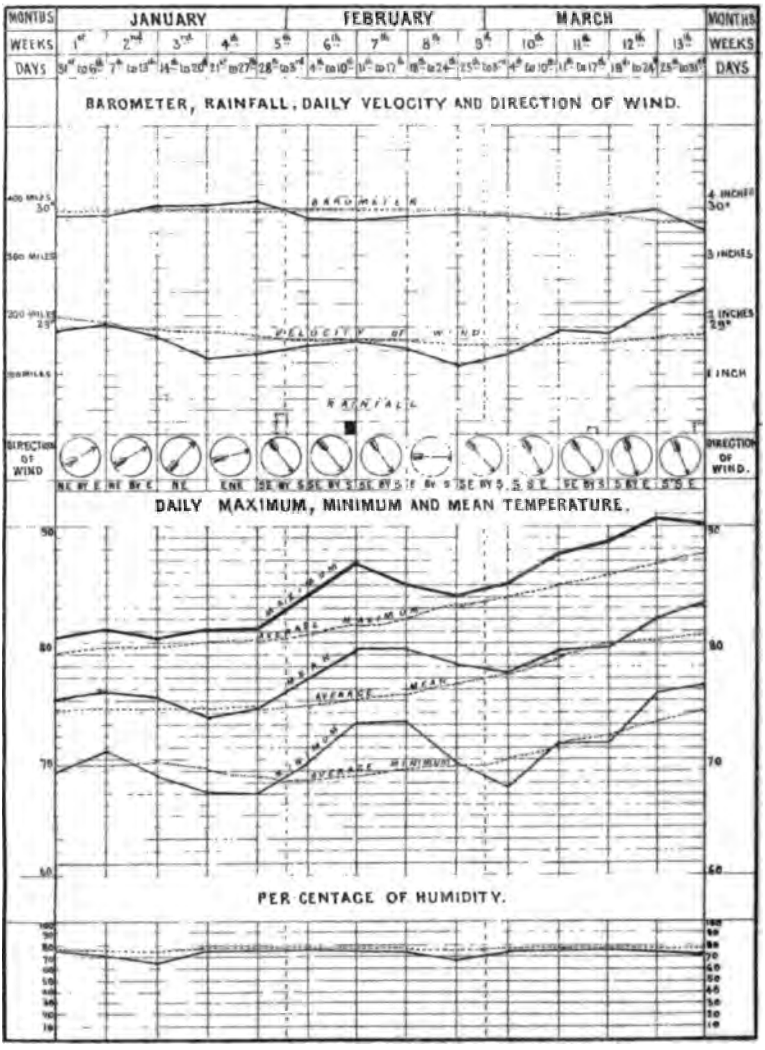


N.B. The total Mortality from each disease during each week is plotted on the perpendicular lines which represent these periods. The horizontal dotted wave lines show the average mortality from each disease for the previous five years.

Alex. Barren Lith. Madras 1866

Madras Quart. Journ. of Medical Science

DIAGRAM SHOWING THE METEOROLOGICAL CONDITION OF MADRAS, DURING THE 1ST QUARTER _ 1866.



N. B. The mean weekly Meteorological elements are plotted on the perpendicular lines. The dotted wave lines show the bi-monthly average for twenty years from observations kept at the Madras Observatory.

Alex. Barren. Lith. Madras 1866

Comparative table showing the mortality from Miasmatic diseases in the last thirteen weeks, as shown upon the accompanying diagram.

	Jan. 6th.	Jan. 13th.	Jan. 20th.	Jan. 27th.	Feb. 3rd.	Feb. 10th.	Feb. 17th.	Feb. 24th.	Mar. 3rd.	Mar. 10th.	Mar. 17th.	Mar. 24th.	Mar. 31st.	Total.
Fevers	46	50	43	35	31	46	52	38	44	46	36	39	45	551
Diarrhœa	19	18	23	25	26	43	19	12	17	19	12	19	18	270
Dysentery	31	24	22	21	32	30	24	19	30	33	23	25	28	342
Small Pox	4	1	2	1	4	2	...	1	2	...	4	3	4	28
Cholera	14	18	24	30	25	20	10	19	29	24	15	41	55	324
Other Miasmatic Diseases	2	1	2	2	2	2	3	2	3	3	3	..	2	27

Average of the corresponding weeks for five previous years.

	Jan. 6th.	Jan. 13th.	Jan. 20th.	Jan. 27th.	Feb. 3rd.	Feb. 10th.	Feb. 17th.	Feb. 24th.	Mar. 3rd.	Mar. 10th.	Mar. 17th.	Mar. 24th.	Mar. 31st.	Total.
Fevers	39·0	41·8	44·2	36·6	42·0	44·6	38·2	39·4	40·2	39·0	38·8	40·2	41·6	525·6
Diarrhœa	19·4	21·2	18·4	17·6	18·4	17·4	16·0	16·6	18·4	15·8	15·4	18·4	15·8	228·8
Dysentery	25·4	23·8	25·4	24·8	25·0	26·2	20·8	24·0	22·8	23·4	23·0	23·4	21·8	309·8
Small Pox	5·8	7·0	10·6	8·4	8·6	16·2	17·8	17·6	15·4	16·8	21·0	22·0	17·8	185·0
Cholera	36·6	41·2	64·0	63·0	56·6	56·8	63·0	59·6	51·0	50·6	31·6	30·2	32·4	636·6
Other Miasmatic Diseases	3·2	2·8	1·6	2·6	2·0	3·0	3·0	2·2	3·6	3·4	3·2	3·8	4·4	38·2

Mean Meteorological observations for the past thirteen weeks.

	Jan. 6th.	Jan. 13th.	Jan. 20th.	Jan. 27th.	Feb. 3rd.	Feb. 10th.	Feb. 17th.	Feb. 24th.	Mar. 3rd.	Mar. 10th.	Mar. 17th.	Mar. 24th.	Mar. 31st.	Total.
Barometer reduced to 32° F.	29·984	30·040	30·044	30·078	29·947	29·913	9·951	9·951	29·927	29·907	29·95	29·99	29·84	29·963
Mean Maximum Temperature	81·4	80 6	81·4	81·4	83·9	87·04	85·02	84·01	85·04	87·8	88·8	90·3	90·6	85·17
Do. Minimum do.	70·7	68·6	67·3	67·02	69·7	73·10	73·20	69·80	67·7	71·3	71·3	75·4	76·0	70·85
Mean Temperature	75·9	75·6	73·9	74·5	77·1	79·6	79·5	77·2	76·4	79·7	79·9	82·1	83·2	78·04
Do. Humidity	71·2	68·4	76·8	75·1	78·7	76·7	73 2	68·2	73·0	75·7	76·8	77·0	74·3	74·23
Prevailing Wind	N. E. by E.	N. E. by E.	N. E.	E. N. E.	S. E. by S.	S. E. by S.	S. E by S.	E. by S.	S. E. by S.	S. S. E.	S. E. by S.	S. by E.	S. S. E	
Mean Velocity in miles	174·1	152·4	110·1	117·5	131·0	136·7	125·1	98·5	116·2	154·7	148·5	194·4	221·0	144·6
Rain fall	...	...	...	...	...	0·03	...	...	...	...	...	..	...	0·002

No. 8.—*Madras Mortuary Report, for the Second Quarter of* 1866. By Hon'ble R. S. Ellis, C. B., Sanitary Commissioner.

1. The health of Madras has not been so satisfactory during the past quarter as during the one which preceded it. The total number of deaths registered has been 2,926, which, contrasted with the average of corresponding quarters for ten previous years, shows an increase of 404 deaths.

1861	2,967
1862	3,260
1863	2,949
1864	2,422
1865	2,319
Mean	2,783

The average number of deaths during the second quarter of five previous years, as shown in the margin, is 2,783, thus giving an increase in the mortality during the period under review of 143, and an increase of 607 over the same period for 1865.

2. The second quarter is usually the healthiest season in Madras, but this year, there is but a very slight difference between it and the first, as the number of deaths registered is only 34 less.

This is more a matter of surprise as the quarter immediately preceding it is one of the two most unhealthy periods of the year in Madras.

3. The deaths from Miasmatic diseases have amounted to 1,469, or a little more than half the total number registered, showing an increase on the average of the past five years of 13 deaths and a decrease of 52 on the first quarter.

4. The following table shows the total number of deaths registered amongst the different classes of the population.

	Europeans		East Indians.		Hindoos.		Mahomedans.		Total.		General Total.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Fevers...	2	1	8	1	240	251	21	29	271	282	553
Diarrhœa	...	1	2	4	99	103	9	7	110	115	225
Dysentery	2	...	2	1	116	138	17	11	137	150	287
Small-pox	...	...	...	...	17	17	...	...	17	17	34
Cholera	2	1	1	7	153	118	17	21	173	147	320
Other Miasmatic diseases	1	...	3	1	24	14	4	3	32	18	50
Total Miasmatic...	7	3	16	14	619	641	68	71	740	729	1469
Total of all other diseases	17	12	17	28	633	517	108	125	775	682	1457
Total...	24	15	33	42	1282	1158	176	196	1515	1411	2926
***Mean Mortality of* 10 *Second Quarters, from* 1856 *to* 1865.**											
Miasmatic diseases	8·8	2·9	14·0	13·8	554·6	515·9	72·5	74·4	649·9	607·0	1256·9
Other diseases	16·8	5·3	21·1	20·4	526·1	468·3	103·4	103·5	667·4	597·4	1264·8
Total...	25·6	8·2	35·1	34·2	1080·7	984·1	175·9	177·9	1317·3	1204·4	2521·7
Increase	5·2		5·7		375·2		18·2		404·3		
Decrease	...		...		...		...		...		...

5. From the above it appears that the deaths from Miasmatic diseases have increased during the past quarter on the previous ten years by 212, and from all other diseases by 192; but taking only the last five years into consideration (which period is most to be relied on) it is seen that out of the 143 total number of deaths which have increased on the average for this period, only 13 have been due to Miasmatic diseases, leaving 130 to be accounted for by other causes.

6. Unfortunately from the way in which the register has been hitherto kept, it is not possible without a great deal of time and labor to show exactly the different diseases which have made up this increased death-rate, but from a comparison of the register with those which have been kept during past years, it may be stated there has been an increase amongst local classes of disease, especially nervous disorders. Young children appear to have suffered largely from convulsion.

7. An examination of the accompanying diagram will show, far better than can be described, the course taken by the diseases which have made up more than half the total number of deaths during the past quarter; comparisons can also be made with the average death-rates and the Meteorological phenomena of the hot season.

8. FEVERS.—The mortality from the diseases registered under this head has been 553, or 23 more than the average. During April it is seen that the deaths were below the five years' wave line, but from the 1st week in May till the middle of June, they are considerably above it. During the last two weeks of the quarter they begin to decrease.

9. DIARRHŒA.—The number of deaths registered from this cause amounts to 225, being an increase of 12 on the average for five years. The only disturbance in the wave line of this disease, which runs tolerably equally with that of the other, occurs in the week ending the 21st June, when a sudden rise takes place and as sudden a fall during the following weeks.

10. DYSENTERY.—The number of deaths during the quarter amounts to 287, being 17 above the average. During the first part of the period, the deaths were below the average, but during the latter half they rise considerably

above it. It is observed that there is no correspondence between the wave line of this and the former disease.

11. SMALL POX.—The number of deaths registered has been 34 against an average of 126 deaths. This continued and striking difference in the deaths from this disease as compared with former periods speaks of itself for the prophylactic advantages derived from vaccination, which has of late been so actively carried on in Madras. It is to be observed that the only deaths which have occurred are amongst Hindoos, a race prejudiced by religious ideas against the operation. Out of 28 deaths which occurred during the first quarter, 27 were of this class, and as will be shown in the Annual Mortuary Report for 1865, (now passing through the press) out of a total of 44 deaths during the year, 41 were Hindoos. The almost total cessation of deaths from this disease amongst all classes, but this one, should overcome, if any thing can, the prejudices imbibed by religious superstitions.

12. CHOLERA.—The number of deaths registered from this disease has been 320 or 36 more than the five years average. A glance at the Chart shows that it has never once been absent from Madras, and that its increment and decrement have been erratic as compared with the average wave line. On the last week of the first quarter, the deaths rise to 55. At the commencement of the second, the wave line falls steadily throughout April till the middle of May, when it reaches its minimum in the 5th week ending May 5th. At this time only 8 deaths were registered. A sudden rise then occurs extending from the 6th week to the 8th, a maximum of 31 being reached during the week ending May 19th. During this outbreak 64 deaths were registered; the cases chiefly occurring in Royapooram and the neighbouring districts of the 7th division.

A steady rise in the mortality again takes place from the week ending June 9th, till the 12th week ending the 23rd of June, when the maximum number of deaths 50, is reached. This is the largest number that has occurred in any one week of the quarter. During the five weeks over which this outbreak extended, 169 deaths were registered, the cases being chiefly confined to Peddoo Naick's Pettah.

13. The season has been remarkable for the very high temperature which has existed at certain times. Not only has the mean temperature been far above the average for

the past twenty years, but the past quarter is distinguished as being one in which has occurred, the hottest day on record. This excessive heat has doubtless been due to the almost entire absence of any rain fall; and, as might be expected, these extraordinary meteorological conditions have exercised a very marked influence on the death rate of the town of Madras as well as other parts of the Presidency. These peculiarities will be better understood by a reference to the Chart.

14. ATMOSPHERIC PRESSURE.—This element has averaged during the quarter 29·745 reduced to 32° F., being ·01 lower than the average. A rapid descent in the Barometer is noticed during the weeks ending the 5th and 12th of May.

15. TEMPERATURE.—The temperature during the past quarter has been excessive as has just been stated, and more especially so during the period commencing with the last week in May and ending with the 2nd week in June. At this time both the days and nights were very oppressive and trying to all classes.

The average mean temperature has been 88·8° F. or 3·7° F., hotter than the same period for twenty years previous. The excess is shown by the wave lines on the diagram.

The line of temperature rises steadily during the first two weeks of the quarter, and with the exception of a slight fall during the last half of April and a sudden dip during the week ending the 26th May, the thermometer continued to rise till the middle of June, when, during the week ending June 9th, the average daily maximum registered 106° F. in the shade.

On the 28th of May the thermometer stood at 110·6° in the shade, and the Government Astronomer remarks that this "was the hottest and dryest day on record at Madras.

"The wet bulb thermometer read 35·8 below the standard at 4 P. M., and the quantity of moisture in the air was only 16 per cent. of that required to saturate the atmosphere and produce rain. The thermometer reached above 106° F. on six days during the half month, (May) the average maximum of past years being only 95° F. The greatest reading of a black bulb in vacuo was 155° F., on the 19th."

16. HUMIDITY.—The percentage of Humidity has been 63 during the quarter, which is 7 degrees below the average; as will be observed from the Chart; the excessive dryness of the air existed chiefly during May and June.

17. RAINFALL.—The rainfall has been very far below the average, having amounted to only ·286 inches during the quarter, and only ·316 since the 1st of January. The average rainfall up to the present time is 7·64 inches, of which 5·16 inches should fall during the 2nd quarter. As it is, there is a deficiency of 6·35 inches this year.

18. VELOCITY AND DIRECTION OF WIND.—During the first five weeks of the quarter the prevailing wind was from the S.S.E. During May it was S., and for the last three weeks it has blown from a westerly quarter. Throughout the quarter, its velocity has been very high, compared with former years, and on several occasions these high winds have been accompanied by dust storms.

The average daily velocity has been 235 miles or 30 *more than the usual average.*

19. As before stated, the increased mortality of the present quarter must be to a certain extent attributable directly and indirectly to a season of such an exceptional character, and although this increase is not due to the class of diseases which have been shown in the diagram, there are still a few points of interest which may be briefly noticed in comparing these meteorological and sickness charts. Before doing so, however, it may be remembered that although the meteorological conditions which have existed during the past quarter, such as extreme heat, low percentage of humidity, Southerly and South Easterly winds with increased velocity, *alias* ventilating powers, are such as might be expected to retard the development of miasmatic causes of disease, still the enervating effects of continued high temperature will naturally, in common with all other debilitating causes, render the constitution more liable to miasmatic influences, and thus indirectly increase the death-rate of the population.

20. It is to be observed by a reference to the diagrams, that the wave line of deaths registered as fevers, follows in a most marked manner the wave line of high temperature. It commences to rise above the average during the 5th week of the quarter, describes a curve, the highest part of which

passes through the 6th week, and falls lowest in the 8th. It again rises in the following weeks (9th and 10th) and falls through the 11th and 12th. Almost precisely the same curve is taken by the wave line of high temperature.

21. A sudden ascent takes place in the temperature during the 9th week with a fall in the humidity of the air; an equally sudden rise in the deaths by diarrhœa takes place. At this same period, a fall takes place in the deaths from dysentery. Singularly the curve of deaths from the latter disease takes an almost opposite course to that showing the deaths from diarrhœa.

22. On the wind shifting from a Southerly to a Westerly quarter, the deaths from Fevers, Diarrhœa and Dysentery, all fall below the average.

23. During the 1st and 2nd weeks of the quarter in which the first rise in temperature occurs, there were two deaths from apoplexy. During the 6th and 7th weeks of the quarter in which a rapid rise in the temperature takes place, there were 2 deaths from sun stroke and 5 from apoplexy registered. Of the former one was a European and the other a Mahomedan. Of the latter two were Europeans, one an East Indian, and two were Hindoos.

24. In the hottest part of the quarter extending over the 9th, 10th, and 11th weeks, two deaths from sun stroke and four from apoplexy occurred. The former were two Hindoos. Of the latter two were Europeans, one an East Indian, and one a Hindoo.

During the quarter, therefore, four sun strokes have occurred, and eleven deaths from apoplexy due to the excessive heat of the weather.

Table showing the mortality from ***Miasmatic Diseases*** *in the last thirteen Weeks as illustrated by the accompanying Diagram.*

	April 7	April 14	April 21	April 28	May 5	May 12	May 19	May 26	June 2	June 9	June 16	June 23	June 30	Total.
Fevers	37	40	40	38	42	53	50	42	47	49	41	37	37	553
Diarrhœa	17	20	17	16	18	20	18	15	25	18	11	16	14	225
Dysentery	21	24	23	18	21	24	23	28	18	27	26	18	16	287
Small Pox	5	1	2	5	5	3	4	2	2	2	0	2	1	34
Cholera	33	18	20	9	8	22	31	11	13	24	38	50	43	320
Other Miasmatic Diseases	2	2	4	4	3	5	6	3	6	4	5	4	2	50
	115	105	106	90	97	127	132	101	111	124	121	127	113	1469

Average of the ***Corresponding Weeks for*** 5 ***previous*** *Years.*

	April 7	April 14	April 21	April 28	May 5	May 12	May 19	May 26	June 2	June 9	June 16	June 23	June 30	Total.
Fevers	38·2	40·8	40·8	39·6	42·6	40·0	41·4	39·0	40·8	39·0	43·2	41·6	43·8	530·8
Diarrhœa	17·2	14·0	17·8	15·6	17·8	17·6	18·8	14·2	15·6	16·2	14·6	15·6	18·8	213·8
Dysentery	21·0	24·0	23·0	23·6	20·2	21·4	22·4	19·4	22·0	17·6	.5·8	19·0	21·2	270·6
Small Pox	16·6	15·8	15·6	11·0	12·0	10·4	8·2	8·4	7·0	4·8	5·8	5·2	5·6	126·4
Cholera	24·4	23·4	20·6	22·6	22·6	23·4	21·2	19·9	16·0	20·2	18·6	14.8	17·0	264·7
Other Miasmatic Diseases	6·4	4·4	5·0	5·4	3·2	4·0	2·8	3·4	2·4	4·0	2·6	3·4	3·4	50·4
	123·8	122·4	122·8	117·8	118·4	116·8	114·8	104·3	103·8	101·8	100·6	99·6	109·8	1456·7

Mean Meteorological Observations for the past 13 Weeks.

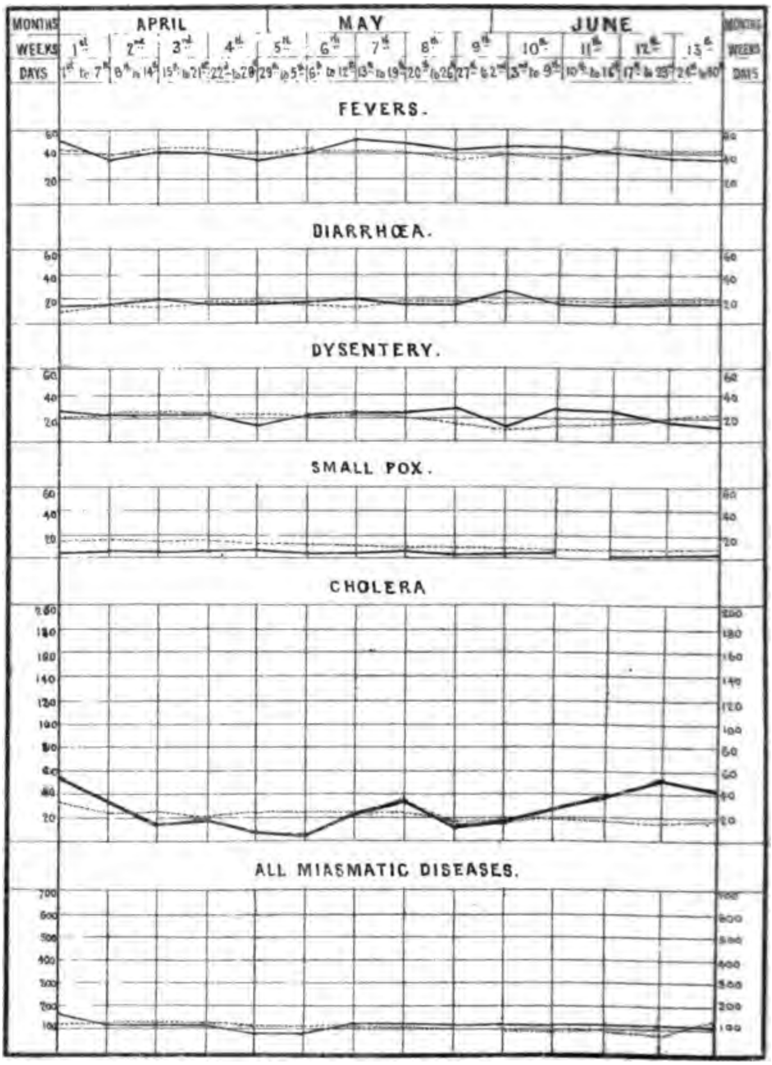
	April 7	April 14	April 21	April 28	May 5	May 12	May 19	May 26	June 2	June 9	June 16	June 23	June 30	Average.
Barometer reduced to 32° F	29·821	29·787	2984·4	29·894	29·782	29·684	29·713	29·701	29·681	29·706	29·649	29·701	29·734	29·745
Mean Maximum temperature	91·3	94·9	93·6	93·2	95·3	101·8	102·1	97·6	105·5	106·05	102·4	99·1	101·7	98·81
do Minimum do	77·9	79·6	79·6	80·3	80·1	82·4	82·5	82·7	83·6	84·05	84·1	82·4	83·6	81·77
Mean Temperature....... ...	84·4	86·3	85·8	86·3	86·8	90·3	89·5	89·2	91·9	91·1	90·6	88·4	90·08	88·51
Mean Humidity............. ...	74·8	71·0	72·8	73·7	71·7	61·5	63·7	68·0	56·7	55·8	48·5	55·5	51·5	63·4
Prevailing Wind............	S. E.	S.S.E.	S.S.E.	S.S.E.	S.S.E.	S.	S.	S.	S.S.W.	S.	W.	WSW	W by S	S.
Mean Velocity in Miles... ...	192·2	253·2	249·4	191·1	167·4	261·2	299·5	253·1	246·1	268·5	336·0	306·2	310·5	256·4
Rain fall	2	0	0	0	0·08	0	0	0	0	0	001·6	0·16	0·03	0·286

Table showing the mean half Monthly Meteorological condition of Madras for 20 years past.

	Half month ending 15th April.	Half month ending 30th April.	Half month ending 15th May.	Half month ending 31st May.	Half month ending 15th June.	Half month ending 30th June.	TOTAL.
Barometer reduced to 32°F.........	29·843	29·806	29·756	29·707	29·692	29·704	29·751
Mean Maximum Temperature.....	90·0	91·0	93·0	95·1	95·8	93·7	93·1
Do. Minimum do	77·4	78·4	79·8	80·4	80·7	79·4	79·3
Mean Temperature........................	83·1	84·0	85·3	86·2	86·6	85·0	85·03
Mean Humidity.........................	76·	75·	73·	68	64·	67·	70·5
Prevailing Wind..................... ..	S. by E.	S. by E.	S.	S.S.W.	S. W.	S. W.	S. W.
Mean Velocity in Miles	173	175	201	218	230	235	205
Rain fall............................... ..	0·16	0·65	1·32	1·60	0·02	0·51	5·16

[redacted]

DIAGRAM SHOWING THE MORTALITY FROM MIASMATIC DISEASE IN MADRAS, DURING THE 2nd QUARTER_1866.

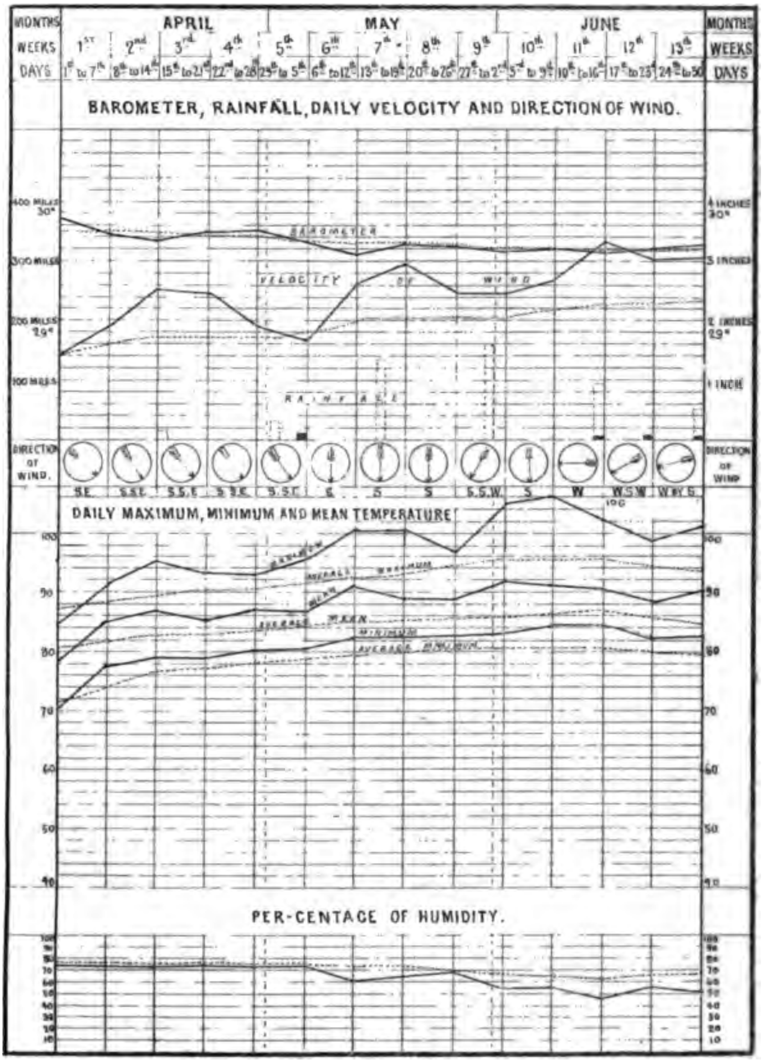


N.B. The total Mortality from each disease, during each week is plotted on the perpendicular lines which represent these periods. The horizontal dotted wave lines show the average mortality from each disease for the previous five years.

Alex^r Barton. Lith. Madras 1866.

Madras Quart: Jour. of Medical Science

DIAGRAM SHOWING THE METEOROLOGICAL CONDITION OF MADRAS, DURING THE 2ND QUARTER _ 1866.



N. B. The mean weekly Meteorological elements are plotted on the perpendicular lines. The dotted wave lines show the bimonthly average for twenty years from observations kept at the Madras Observatory.

Alexr. Barren Lith Madras 1866.

[redacted]

[ETEOROLOGICAL RESULTS *from the Madras Observatory Register, for the month of April,* 1866.

to 32°.	Standard Thermometers. Observed extremes. Maxim.	Minim.	Daily means. Dry.	Wet.	Percentage of humidity.	Wind. Prevailing direction.	Daily velocity.	Depth of rain.	GENERAL REMARKS.
ches.	°	°	°	°	per cent.		Mls.	Ins.	
·817	90·2	77·6	84·0	78·8	76	S. E.	246	......	Fine.
·842	91·0	77·9	84·7	78·1	75	S. E.	205	....	Passing clouds.
·801	91·4	79·7	85·2	78·3	74	S. E.	220	....	Do.
·817	90·8	79·4	84·9	77·2	71	S. E.	169	......	Light clouds.
·842	91·3	79·8	84·8	77·8	74	S. E.	172	....	Chiefly fine.
·829	90·5	76·1	83·3	77·4	77	S. E. by S.	158	. ....	Fine.
·768	94·3	76·4	84·1	77·9	75	S. S. E.	208	.. ....	Do.
768	93·5	78·1	86·2	76·9	66	S. S. E.	229	....	Hazy.
·802	93·8	80·8	86·3	78·9	73	S. S. E.	253	....	Passing clouds.
·789	95·6	79·8	86·4	78·8	72	S. by E.	268	....	Light haze.
·756	97·6	78·3	85·9	77·6	69	S. by E.	267	....	Do.
·742	94·6	80·7	86·8	79·1	72	S. by E.	252	. .....	Fine.
·819	95·3	81·1	86·7	78·9	72	S. S. E.	266	....	Do.
·836	94·4	79·0	85·9	78·7	73	S. S. E.	238	....	Do.
·804	93·1	78·6	85·5	78·9	75	S. S. E.	257	....	Do.
·801	95·4	79·9	85·9	78·1	71	S. S. E.	276	....	Fine.
·846	93·9	78·9	85·5	77·2	69	S. S. E.	238	......	Chiefly fine.
·859	91·8	77·2	84·6	78·2	76	S. E. by S.	226	....	Do.
·846	93·5	79·8	86·2	79·0	73	S. S. E.	245	....	Fine with passing clouds.
·860	94·3	82·0	86·6	79·1	72	S. S. E.	268	....	Occasionally cloudy.
·892	93·7	80·8	86·4	79·3	74	S. E. by S.	236	....	Cloudy before sunrise: fine
·927	92·8	79·7	86·6	79·8	75	S. E.	188	....	Do. do. [after.
·928	93·7	81·1	86·4	79·6	75	S. E.	153	....	Cloudy before sunrise: fine
·919	93·4	81·6	86·4	78·6	72	S. S. E.	185	....	Light clouds. [after.
·871	93·7	80·4	86·3	78·9	73	S. E. by S.	201	....	Slowly passing clouds.
·861	93·0	81·1	86·7	79·0	72	S. S. E.	224	....	Light passing clouds.
·883	93·4	79·6	86·3	79·3	74	S. S. E.	194	....	Chiefly fine.
·874	92·9	79·2	85·9	79·1	75	S. S. E.	193	....	Do.
·854	92·6	76·9	86·1	79·2	74	S. S. E.	206	....	Do.
·830	93·1	79·0	86·4	78·6	72	S. E. by S.	173	... .	Light hazy clouds.

Standard Barometer and Thermometers are read at 10 A.M., 4 P.M., and 1 P.M.. Daily Means are obtained by the application of hourly corrections, deduced from, years' observations. The Cistern of the Barometer is 27 feet above the level of the the Receiver of the Rain-gauge is three feet from the ground. The Wind and gistered are for the current civil day—from midnight to midnight.

N. R. POGSON, Government Astronomer.

METEOROLOGICAL RESULTS *from the Madras Observatory Register, for the month of May,* 1866.

May 1866.	Barometer reduced to 32°.	Standard Thermometers. Observed extremes. Maxim.	Standard Thermometers. Observed extremes. Minim.	Standard Thermometers. Daily means. Dry.	Standard Thermometers. Daily means. Wet.	Percentage of humidity.	Wind. Prevailing direction.	Wind. Daily velocity.	Depth of rain.	GENERAL REMARKS
	Inches	°	°	°	°	per cent.		Mls.	Ins.	
1	29·289	92·0	81·8	85·2	79·4	78	S.E. by S	106	0·08	Passing clouds. Sh
2	29·802	93·5	79·1	86·5	78·8	72	S. E.	135	....	Passing clouds. [1
3	29·773	93·1	80·6	85·8	78·1	71	S. E.	87	....	Chiefly fine. A modera storm abo
4	29·713	98·1	79·7	87·5	79·8	72	S. S. E.	218	....	Fine.
5	29·674	104·9	83·9	90·1	79·3	63	S. by W.	247	....	Chiefly fine
6	29·658	104·1	84·4	91·2	79·3	60	S. by W.	305	....	Do.
7	29·656	108·1	79·6	92·2	76·6	50	S. W.	232	....	Fine.
8	29·675	104·2	82·8	91·9	76·8	51	S. by E.	204	....	Do.
9	29·704	104·2	83·4	90·7	80·0	63	S.	230	....	Do.
10	29·717	97·3	81·7	88·8	80·7	71	S. S. E.	277	....	Do.
11	29·706	97·9	83·9	88·6	79·8	69	S.	304	....	Light hazy clouds.
12	29·672	96·9	81·3	89·0	79·6	67	S. by E.	277	....	Fine.
13	29·706	96·7	82·5	88·5	80·7	72	S. by E.	317	....	Do.
14	29·722	98·3	81·7	88·6	79·4	67	S.	288	....	Do.
15	29·724	94·6	81·8	88·8	80·1	69	S.	340	....	Do.
16	29·712	106·9	82·6	89·6	79·3	64	S. by W.	306	......	Do.
17	29·696	101·3	82·8	89·9	79·0	62	S. by E.	323	....	Do.
18	29·727	100·1	83·5	90·0	77·3	57	S.	266	....	Hazy clouds.
19	29·709	106·8	83·2	91·1	77·5	55	S. by W.	257	......	Fine morning: cloudy
20	29·716	101·2	83·9	91·2	78·0	56	S.	249	......	Light haze.
21	29·725	94·5	83·5	88·8	81·6	73	S. by E.	290	....	Do.
22	29·710	97·0	81·9	89·0	79·6	67	S. S. E.	227	....	Fine.
23	29·675	96·9	82·5	89·0	80·2	69	S.	208	....	Do.
24	29·671	103·0	82·9	89·2	80·7	69	S.	278	....	Do.
25	29·685	96·0	82·2	89·2	80·2	68	S. by E.	266	....	Do.
26	29·731	95·1	82·3	88·2	81·3	74	S. E. by S	259	....	Hazy.
27	29·723	96·0	82·0	88·9	81·1	72	S. S. E.	231	....	Fine. [day on t
28	29·676	110·6	80·8	94·6	77·2	46	S.W by S.	181	....	Light haze. The
29	29·662	106·7	84·8	93·7	78·7	52	S.	217	....	Hazy clouds.
30	29·664	106·4	86·8	92·3	78·6	55	S. S. W.	301	....	Cloudy.
31	29·652	107·0	85·6	91·6	78·8	57	S. S. W.	316	....	Chiefly cloudy.

The Standard Barometer and Thermometers are read at 10 A. M., 4 P. M., and 1 and the Daily Means are obtained by the application of hourly corrections, deduc twenty years' observations. The Cistern of the Barometer is 27 feet above the lev Sea, and the Receiver of the Rain-gauge is three feet from the ground. The W Rain registered are for the current civil day—from midnight to midnight.

N. R. POGSON, Government A

[ETEOROLOGICAL RESULTS *from the Madras Observatory Register, for the Month of June,* 1866.

to 32°.	Standard Thermometers. Observed extremes. Maxim.	Minim.	Daily means. Dry.	Wet.	Percentage of humidity.	Wind. Prevailing direction.	Daily velocity.	Depth of rain.	GENERAL REMARKS.
ies.	°	°	°	°	per cent.		Mls.	Ins.	
592	106·0	84·2	89·9	78·4	60	S. by W.	257	....	Chiefly cloudy.
398	105·8	82·8	92·4	78·9	55	S. by E.	220	.....	Do.
727	109·0	83·6	91·3	78·1	56	S. by W.	282	....	Hazy and cloudy.
727	108·0	85·2	92·5	78·2	53	S.	257	....	Cloudy. [afternoon.
725	107·0	85·0	92·0	77·1	51	S.	285	....	Chiefly fine. Light shower
571	105·3	83·7	91·4	78·0	55	S.	257	....	Chiefly fine. [clouds.
660	104·3	83·6	91·2	78·2	56	S. by E.	274	....	Fine with light passing
704	105·0	83·6	90·1	78·4	60	S. by E.	289	....	Chiefly fine.
731	103·8	83·7	89·8	78·3	60	S.	236	....	Passing clouds.
703	101·9	81·4	90·7	77·7	56	S.	226	....	Light passing clouds.
574	104·8	83·9	88·6	75·8	56	SWbyW.	251	0·01	Cloudy with light showers.
673	102·4	84·9	91·0	75·6	49	W. by S.	332	......	Chiefly overcast.
665	104·6	85·9	88·4	75·8	57	W.S. W.	315	0·03	Cloudy. Shower about 4½ P.M.
618	102·2	83·0	92·5	72·5	38	W.	376	....	Chiefly overcast.
611	100·0	86·0	91·8	73·1	42	W.	409	0·01	Overcast. Shower at 2¾ P. M.
600	101·0	83·8	91·7	73·0	42	W.	443	....	Chiefly overcast.
636	101·0	84·5	87·0	78·1	67	S. W.	270	0·05	Cloudy. Shower at 8½ P. M.
701	98·9	81·4	85·9	77·0	67	S. S. W.	265	0·29	Passing clouds and showers
734	99·1	79·9	85·4	76·2	66	S. W. by S	299	0·14	Passing clouds, shower at 3¾
694	99·5	79·9	89·1	73·4	48	W. S.W.	367	.....	Cloudy. [P. M.
668	99·7	83·3	90·9	73·7	45	W. S.W.	312	....	Chiefly overcast.
709	97·8	84·3	90·4	73·8	46	W. S.W	344	....	Overcast.
770	98·2	84·0	90·2	75·1	50	SWbyW	287	....	Cloudy.
747	100·1	84·0	91·0	73·0	43	W.	403	.. ....	Do.
683	102·2	83·3	92·3	74·1	43	W. by S.	391	......	Passing clouds.
691	103·4	83·1	91·1	76·4	52	W. by S.	316	0·03	Chiefly fine. Shower at 9¼
723	102·0	83·6	88·4	76·0	57	S. W. by S	283	....	Hazy clouds [P. M.
760	101·5	83·5	88·4	76·0	57	S. S. W.	276	....	Cloudy.
775	100·5	85·6	90·1	76·2	53	S.	259	....	Fine with passing clouds.
765	102·4	82·6	89·3	76·3	56	S by E.	226	....	Do.

Standard Barometer and Thermometers are read at 10 A. M., 4 P. M., and 10 P. M.,)aily Means are obtained by the application of hourly corrections, deduced from ears' observations. The Cistern of the Barometer is 27 feet above the level of the the Receiver of the Rain-gauge is three feet from the ground. The Wind and stered are for the current civil day—from midnight to midnight.

N. R. POGSON, Government Astronomer.

PART IV.

MEDICAL INTELLIGENCE.

Madras Medical College.

Termination of the Session 1865-66.

The Session 1865-66 terminated on the 29th of June, on the evening of which day the Annual Meeting for bestowal of Certificates of Qualification and Prizes was held in the Memorial Hall:—Sir C. H. Scotland, C. J., in the Chair.

During the past year, a change in the College arrangements has taken place, viz:—the division of the nine months' Session into two periods, a Winter Session, extending from 1st October to 30th March, and a Summer Session extending from 1st April to 29th June. This arrangement allowed of a sub-division of some of the Courses of Lectures. Thus, Minor Surgery, formerly incorporated with the Course on Surgery, was separated as a Summer Course. The Course on Diseases of Women and Children was, in the same way, detached from the Midwifery Course. The Lectures on Organic Chemistry were likewise made a Summer Course, those on Inorganic Chemistry being delivered during the Winter Session. And, in order to meet the requirements of the Madras University, a course on Comparative Anatomy was delivered in the College for the first time.

At the Meeting, the Principal's Annual Report (which we hope to be able to publish in our next number), was first read; the Prizes and Certificates of Qualification were then distributed by the Chairman to the successful Competitors; after which the following Valedictory Address was delivered by Dr. Bidie, Professor of Botany, Materia Medica and Therapeutics.

Dr. Bidie's Valedictory Address.

GENTLEMEN AND STUDENTS,—The Annual Course in the Medical College being at an end, I have, at the request of the Principal, to offer a few closing remarks, chiefly for the benefit of those who are here as Students for the last time. This day is a momentous one in their lives, as they are now about to enter on the serious business of life, and because a great deal depends on their making

a fair start and taking the right turning. There is, I believe, for every life a path, which, if steadfastly pursued, will lead to more or less of success and honour; and there are also tracks, which, if followed, must end in defeat and disgrace. To young men beginning their career, the future generally wears a bright and enticing aspect, and, although I cannot promise that all their hopes will be realized, yet I may safely assure them, that an active, earnest, and upright life will, sooner or later, meet with its reward. I may also assure them that contentment, one of the greatest of earthly blessings, is not entirely dependent upon, or commensurate with success, for he who seeks for that condition in the consciousness of duty well done, may be far happier than the man whose success has surpassed the most ambitious dreams of his youth. The profession to which they have attached themselves is a most humane and honorable one, and its origin an old story, nearly as old as that of disease. Wherever man exists the evils of Pandora's box assail him, and whether consumed by fever, racked by rheumatism, or pierced by cruel iron, he instinctively seeks relief from pain and disease, and shrinks with horror from death. Thus we may infer that the medical art, however crude and imperfect, originated in the very earliest stages of society, and on opening the pages of history, we learn that it was cultivated in very remote times, and had an amount of attention devoted to it that was not given to any other art. As civilization advanced, it rapidly became developed, fundamental truths, like diamonds, being freed from incrusting error, and barbarous appliances and implements supplanted by others of a more humane and rational character. Such progress was a necessary consequence of increased mental culture, accumulating discovery and advancement in cognate arts and sciences, and to have stood still would have involved extinction. Indeed, the facts of the art of medicine having existed for so many centuries, of its having stood so many shocks and trials, and advanced *pari passu* with other sciences, are strong proofs of its being based on truth. But civilization has, in another way, promoted the development of the healing art, namely, by increasing the demands upon its resources. In the earlier stages of society, when the habits and food of a people are simple and natural, their ailments are also, generally speaking, simple and few. Accordingly we find that, in such countries as England, the placid life and plain dietary of past generations freed them from many ailments, which a change of habits has entailed on their descendants. Perfect health, too, like perfect beauty, is quite an ideal condition, a state not attainable by any hygienic means, and as soon as we think that we have, by our skill, banished one fell disease and destroyer of the race, another starts up to take its place. Thus the medical art can never be spared, or become stationary, while man continues to live and labour as he has been doing.

Medicine naturally divides itself into two branches, viz.: CURATIVE and PREVENTATIVE. The former division is the one that would first receive attention, as uncultivated man cares more for the present than the future, and does not seek to anticipate evils, although ready enough to solicit relief from them when they arise. Thereafter, although modified by advancing civilization, the same natural causes would continue to stimulate the development of curative medicine, and in course of time it attained such proportions, as led it to be regarded as the entire art. No doubt reflective minds had occasional glimmerings of the *terra incognita* that lay in another direction, but until recent times no one had the boldness to explore it; and, truly, it requires the intellect of genius and the courage of a hero, to develope a new, or elevate a neglected art or science. Hence preventative medicine, or Hygiene, is of recent origin as an art; but, looking at the progress it has already made, its capabilities, and the necessities of the age, there cannot be a doubt that it will soon be quite as extensive, and be regarded as far more important than its elder sister. In saying thus much it is by no means intended to depreciate curative medicine, ever the good Samaritan to suffering humanity, but it seems inevitable that it will eventually prove less satisfactory than Hygiene because it deals with individuals rather than large bodies of men, and combats effects rather than causes. With tender care and sympathy curative medicine hastens to the relief of man when he becomes the victim of disease, but takes no cognizance of him when he has risen from the bed of sickness and gone forth to his labour. Hygiene, on the other hand, a feeble type of the Divine care, taking up man at his birth, watches over him through life, noticing every agent that can affect his health or comfort, and using every means to promote vigour of mind and body, and render death more remote. Grand aims these, and worthy of the respect and attention of all men; and yet Hygiene has hitherto had to fight a hard battle for very existence, and often to bear the mortification of finding its labours and teachings treated with neglect or contempt! Hygiene is not a distinct science like chemistry, zoology, or the like, but an art, consisting of principles deduced from physiology, curative medicine, meteorology, geology, chemistry, and other sciences. It finds man a prey to numberless diseases, and having learned from the physician the causes of these, it seeks by the practical application of other sciences to frame rules that will either destroy such causes, or enable man to resist their evil influences.

Now, on looking at man as an individual or in masses, there will be found certain general agents that affect his health for better or for worse, and exert a notable influence on the development or arrest of disease. These are *water, air, heat, food, soil, occupation, habits, social relations, exercise of mind and body, and moral discipline.* With these, then, Hygiene has to deal, and it endeavours so to

guide man, as that all of them shall be conducive to health and vigor of body and mind. Now, although it might be supposed that it would be a very easy matter, to persuade men to conform to rules that would promote their own health and that of their offspring and neighbours, practically it has proved a most difficult and thankless task. Man, generally speaking, is so much the slave of appetite, that he stoutly resists any interference with his food or drink, so much wedded to pernicious habits, that he will not believe they are wrong, and, alas! so often swayed by evil passions, that he will peril his very existence for their gratification. Again, as a member of the community, he is often so intensely selfish or reckless, as to do things that may be convenient or profitable to himself, although they are repugnant to the feelings and obnoxious to the welfare of others. Thus, in every large town you will find individuals who keep their premises in such a filthy state as to render them a nuisance and source of disease to all in the neighbourhood, while others practise some art or calling highly offensive and most prejudicial to the public health. In such cases it becomes the duty of the public authorities to interfere, and it is gratifying to know that Government has become fully alive to its responsibility in this respect, and is sparing neither pains nor expense to protect and promote the health of the people.

And now, if we consider for a little the life and habits of our native fellow-subjects, we will find that but very little attention is paid by them to the rules of Hygiene. This much, however, must be said in extenuation, that they more frequently err from ignorance than intent. What, for instance, does the poor villager, remote from the centres of European light and civilization, know of the laws of health? Nature and a stern religious code have taught him that frequent ablutions of his sun-baked, sweat-stained body are good and necessary, but these washings may be said to constitute all that he knows or cares about sanitary measures. Of the benefits resulting from abundant supplies of pure air and water he is utterly ignorant, and as to food he often finds it so difficult to fill a large and craving stomach, that he is more anxious about quantity than quality. Taking native houses as a whole, they may be characterized as dark, badly-ventilated and dirty, so that the inmates live constantly in a vitiated close atmosphere, and are deprived of the healthy stimulus of light. To make bad worse, it is no uncommon thing in Mofussil villages to find cattle, during the night, tied up in one end of the ryot's cottage, and pits situated within a few feet of the back-door, kept open for months for the reception of ordure. It is also a common practice to have a dung heap attached to each house, which is very carelessly kept, and by its fœtid emanations, poisons the surrounding air from January to December. Time, however, would fail me were I to enter into all

the nuisances of a native village, and show how, by crowded houses and defective drainage, the unfortunate inhabitants live in an atmosphere surcharged with deleterious gases.

Then as to the water supply: nothing can be of greater importance in a tropical climate, both for animal and vegetable life, than abundance of water. Indeed, I hardly know anything more cheering and refreshing after weeks of travel over dusty roads than the sight and sound of a noble river rushing over its pebbly bed; and as I have seen the sepoys on such occasions rushing into the water, shouting with joy the name of the tutelary god, I began to understand how the human mind, without the guidance of Divine truth, might be led to deify so glorious and beneficent an object as the tropical river,—

"for there"
"A pious heart's first impulse would be prayer."

Unfortunately, however, rivers and streams are of rare occurrence in the plains of India, and so the water supply is chiefly drawn from tanks and wells filled by the periodical rain-fall. From various causes, such as the decay of plants, bathing, and the washing of cattle, tank-water is, in general, very impure, and the site of wells is often so badly chosen, that they might rather be denominated cess-pools than reservoirs of wholesome water. The effects of impure air on the system is a subject too extensive for consideration on such an occasion as this, but you are all aware that it has a most deteriorating influence on the bodily powers generally, and is often the exciting cause of disease. The effects of impure water are still more marked than those of impure air, and frequently more sudden in their advent, and when I say that diarrhœa, dysentery, cholera, fever, and various other diseases may be propagated by filthy water, the vast importance of a pure supply will be at once recognized.

I shall now make a brief allusion to the subject of food, as not only does the health but also the character of a people depend, to some extent, on the nature of their food. Of this we have a very good example in India, as the Hindoo, whose diet consists chiefly of farinaceous and oily substances, is, as a rule, much less energetic and courageous than the Mussulman, who indulges freely in animal food. In fact, the diet of the high-caste Hindoo is directly opposed to vigour and activity, inasmuch as it contains but a very limited supply of those elements that enter into the composition of the tissues, which undergo waste by the exercise of the bodily or mental powers; and I question if ever the natives of India can take a high place amongst civilized nations, while they adhere to a dietary so devoid of the all-important *flesh-formers*. Very erroneous ideas as to the food and management of children are also entertained by the native population, and to this may, in some measure, be ascribed the large mortality that prevails amongst their offspring. The early age, too,

at which girls become mothers, and the social and moral disturbances and other evils caused by polygamy and prostitution are inimical to the production of healthy and vigorous children.

Another fertile source of disease in India is, the bad condition of the ground on which most of our towns and villages stand. For long years filth has been allowed to accumulate, and drainage been so neglected, that the subsoil has become one pestilent mass of decaying organic matter, notwithstanding that the surface may look clean and wholesome. Some of our model towns in fact are but whited sepulchres,—very fair to look upon, but full of dead men's bones and rottenness. So long as sun and air prove sufficient to carry off and destroy the noxious vapours that exhale through the oxydized crust, all goes well; but let some atmospheric disturbance occur that reduces the disinfecting powers of these salutary agents, and immediately we have a terrible outbreak of fatal disease. I cannot enter on the subject of habits, occupation, social relations, and other agencies that influence the health of communities, but I hope I have said enough to shew you that Hygiene is one of the most important questions of the day, and I hope you may also be led to feel—more especially Students of the Senior and Second Departments,—that you owe other duties to your fellow-creatures, besides attending on them when they are sick. I have not now a hearer, however humble, that may not, if willing, do much to ameliorate the sanitary condition of the natives of India, and, wherever located, you will always find ample opportunity for helping on the good work. Every town and village, every hamlet and house, yea, all the men and women of this vast Empire, are, more or less, setting the laws of Hygiene at defiance, and hence the squalor, misery and disease that meet us on all sides, and the pestilence that yearly carries off its hecatombs of valuable lives, the thews of trade and labour. Although in all our military and civil stations sanitary improvements are gradually being carried out, yet they are much retarded by apathy and opposition, and besides we shall not reap the full benefit from them, until every town and village throughout the length and breadth of the land shall have been brought under the supervision of a strict sanitary code.

Many things, however, conspire to render it difficult for the European to introduce improvements in the homes and habits of the natives of India. Religious scruples are brought forward to obstruct our efforts, offensive habits are persisted in on the plea of custom, prejudices start up to oppose the most salutary propositions, poverty is pleaded as a plea for dirt, and the most benevolent intentions are often ascribed to sinister motives. To you, native Graduates and Students, and to educated natives in general, we look for assistance in this matter; we regard you as a bond of union and channel of intercourse between us and your countrymen, and trust that you

will teach them better things. Let it be your aim, therefore, to extend the benefits of sanitary improvement by explaining to the people the advantages of it, by smoothing down their prejudices, and by every means in your power strengthening the hands of those who are labouring for their good. Above all, let your own houses and habits be patterns of cleanliness, as example is always more powerful than precept. I would like, indeed, to see the day, when the house of a Medical Subordinate could always be recognized by its superior cleanliness, neatness, and order. In this, too, as in everything else that you undertake, be honest and earnest; first assuring yourselves of the advantages of sanitary improvement, and then straining every nerve to instil into the people at large similar convictions. If you do so, depend upon it your efforts will be crowned with success, and you will have the rich reward of feeling, that you have been instrumental in augmenting the happiness and comfort, and in preserving the lives of a large number of your fellow creatures!

But I must hasten to a close, and before ending would offer a few words of encouragement and advice to those who have passed a successful examination. And first let me congratulate Native Assistant Ailsworth, who has risen from the grade of Dresser to that of Assistant Apothecary. It is always pleasing to see a man thus ascending the ladder of life, and particularly so when, as in this case, we know that he deserves his success. The appearance that he made amongst other candidates before the Examining Committee was highly creditable, and won for him the commendation of being *facile princeps!* He has for some time been a teacher in the Junior Department of the Medical College, and so conducted himself in that capacity, that I am sure every one connected with the College sincerely wishes him a long and an honorable career. To the two native Students of the Senior Department, who have gained the license of the College, I also offer warm congratulations, and would express a hope that they may seek to emulate the career of former native graduates, who, by their talent, worth, and industry, have won for themselves positions of trust and distinction. Although no longer tyros, I would beseech them still to continue students, for what they have hitherto learned will chiefly prove valuable as an aid to, and foundation for, future acquirements. The medical art is especially one of change and progress, and no one need hope to attain or keep an honorable position in it, who does not seek, both by the bed-side and from books, to increase and maintain his stock of knowledge. At all times and under all circumstances be earnest and faithful, and in due season you will meet with your reward.

And now I must address myself to Students of the Second Department, who have passed for the rank of Assistant Apothecary.

All of you will no doubt be soon drafted into the service and scattered over the country, and many of you will have to leave homes where you have enjoyed the kind and watchful guardianship of parent or friend. The time when a young man first leaves the parental roof is always a trying one, and I wish to warn you, that you will find the path on which you are entering surrounded with many specious temptations. Let me beseech you, therefore, to arm yourselves against them with the fear of God, resist them stedfastly in His strength, and as you do so, I can assure you that their attractions will grow feeble, and your powers of resistance increase,—

"Perish policy and cunning,
Perish all that fears the light;
Whether losing, whether winning,
Trust in God, and do the right."

I would especially warn you against intemperance, one of the most common, as it is one of the most seductive of vices. In a military point of view it is a very grave offence, always visited with severe punishment; and in a moral point of view it is a heinous sin, leading swiftly and surely to ruin of soul and body. Once give way to it and you open the doors of your heart to an awful flood of evil, and the records of crime in most countries will tell you that it has generally been the first step in the career of vice. Let me entreat you, therefore, to be vigilant against insobriety, and withal to be faithful, diligent, and obedient, and you will thus win for yourselves the pleasant properties of a good conscience and a fair name.

Lastly, I must say a few words to the native Students of the Junior Department, who have passed as Hospital Assistants. The training they have received is not supposed to qualify them for much more than the performance of the mechanical duties of compounding, administering medicines, and doing similar offices for the sick. Yet even in these, simple as they are, they will have ample opportunities for exercising their good qualities and displaying their usefulness. In the Dispensary let them be clean, active and accurate, and in the Hospital kind and faithful. A stump or sore not properly attended to, may cause a patient much unnecessary suffering and harm, and a dose of medicine delayed for a few hours beyond the proper time of administration, may place the sick man beyond the power of remedies. Let method and order rule all your work, as they save time and prevent mistakes ; and have also a high sense of duty, never being content with merely doing just enough to prevent fault being found with you.

And now I must conclude ; and in doing so, I wish all who are going out of College a long and prosperous life, and hope that they will ever strive to maintain the distinguished character for talent, fidelity, and efficiency, that now belongs to the Subordinate Medical Service of Madras.

Sick Furlough Pay of Medical Officers.

FORT ST. GEORGE, *27th July* 1866.

No. 284 of 1866.—The following extract from a Military Despatch from the Right Honourable the Secretary of State for India, is published :—

Despatch dated 25th June 1866, No. 47.

Para. 5. It has been ruled by Her Majesty's Government that, "pending the settlement of Staff salaries for the Medical Department, in all cases, whether the Staff salary is consolidated or granted in addition to Regimental pay on the old scale, a Medical Officer below the rank of Deputy Inspector-General, on sick furlough, should be allowed to draw, for the first six months, either the amount he would have received under the old rules, or the full Regimental pay and Indian allowances, under the 'new scale' without any portion of Staff salary, whichever may be to his advantage."

Periodicals Received.

Edinburgh Medical Journal to *May* 1866.

American Journal of Medical Sciences, *January* 1866.

THE MADRAS
QUARTERLY JOURNAL
OF
MEDICAL SCIENCE.

OCTOBER 1866.

PART I.

ORIGINAL ESSAYS.

ART. VII.—*Analysis of the Historical Register of the 23rd Regiment W. L. I.* By W. H. MORGAN, Assistant Surgeon.

WITH the exception of the selections from the records of their office, published from time to time by the late Medical Board, there is so little in our Indian medical periodicals regarding Native Regiments, that it is presumed that an analysis of the historical register of a Madras regiment, for a period of seventeen years under the old organization, may not be uninteresting to the readers of this Journal. Every Medical officer, who assumes a charge, doubtless peruses the annual and other reports of his predecessors, some possibly for amusement, others for information, all, it is to be hoped, from a sense of

duty. An outsider could not, of course, be expected to take much interest in the records of any particular regiment, still, there is so much common to all native corps, that the history of one may be accepted as a sample of that of several, if not of all. All native regiments, for example, are recruited from classes with cognate habits and prejudices; they occupy the same stations in turn; vegetate in huts built on the same principle, or rather want of principle; proceed on similar tours of foreign service; and when the men appear before invaliding committees, in nine cases out of ten they would have us believe that (in addition to the reasons furnished by the regimental doctor) they are afflicted with shortness of breath, dimness of sight, impairment of hearing, and burning of the hands and feet. It is also believed that for purposes of comparison the statistics of a native regiment during presanitary times may be of use to others now flourishing in the same station under more favourable circumstances.

It is impossible to read through a narrative like the following, without feeling that the sanitary condition of native troops is capable of improvement, and it is satisfactory to find that the wants of the sepoy are beginning to attract attention. Not long since a proposition for the general hutting of the native army was submitted to the Governor-General in Council, and though for financial reasons its consideration was temporarily abandoned, it was something to have the "full importance" of the proposition conceded by the highest authority in India, contrary to the twilight judgment of those conservatives who imagine the sepoys are well off as they are. Clothing, however, costs less than State barracks, and it requires no great amount of foresight to predict that ere long the Arctic equipment of the sepoy will be replaced by dress better suited to inter-tropical guard rooms. While I write, the insanitary condition of the *boudoirs* to which high-caste females are so partial (despite the public conveniences provided for them by Government) is undergoing consideration. Malcolmson* lived to see sepoys supplied with cots in hospital; hospital bedding was the subject of a special order

* Vide "Observations on some forms of Rheumatism prevailing in India," by Assistant Surgeon J. G. Malcolmson, Madras Medical Establishment. 1835, p. 23.

by Sir Hope Grant in 1864; can it be doubted that attention would be paid to wants infinitely more important if they are brought to notice?

Stations.—The stations occupied by the 23rd Regiment from 1849 to 1866 were as follows: (the historical register from which I quote does not go beyond 1849.)

1849..........Kamptee.
1850-54......Saugor.
1854-56......Seetabuldee and Kamptee.
1856..........Partly *en-route* to Kimedy.
1856-58......Russelcondah.
1858-60......Rangoon.
1861..........Rangoon, Palaveram.
1862-65......Trichinopoly.

Topographical descriptions are rarely given, either because they had been previously rendered by the medical officers when in other charges, or because the latter had only recently arrived, and knew little about the station occupied by the regiment; or had little to add to the available records. With regard to meteorological observations the medical officer who penned the annual report for 1849, and who was unprovided with instruments, "regrets" that he was "unable to offer any body of facts regarding the climate of Kamptee, likely to be of service in a department of knowledge which is every day more and more recommended to our attention by scientific bodies, and which might very profitably occupy our leisure time." There is very little doubt that these remarks would be endorsed by the majority of medical officers in charge of native regiments. At Saugor the regiment was in medical charge of an officer who appears to have been more fortunate than the generality of his brethren in this respect, and we glean the following particulars from his report for 1851-52. "For an Indian station the climate of Saugor is very salubrious; fevers of an intermittent type, rheumatism, slight colds, diarrhœa and dysentery appear to be the prevailing diseases. The thermometer ranges from 109° to 34°. The hot season rarely lasts for two months, and it is only for fifteen or twenty days before the setting in of the rainy season that there is really any hot or oppressive weather.

"The rain set in usually about the autumnal equinox. The fall of rain during 1851 was 47·59 inches, a quantity generally regarded as excessive, but I have been unable to find an authentic statement of the fall in former years with which to compare it. From the middle of September till the middle of March there was an almost uninterrupted continuance of dry weather. The prevailing winds were westerly, varying in the rains a few points to the south, and in the hot weather as much to the north. The coolest weather is from the north and south-east. In the cold weather westerly winds usually bring clouds, and are attended with a rise in the temperature. A south-east wind is uncommon. North-westers are rare. Hail storms are not common, and when they occur in April and May, are injurious to crops." Here follows a monthly statement of the atmospheric phenomena which is too long to extract.

1851-52.	Temperature Faht. Thermometer.			Rain.
Months.	Max.	Min.	Mean	Inches.
April.. ..	103°	66°	93½	0·04
May......	108	75	91½	0·12
June.....	109	75	92	4·10
July......	100	72	86	18·15
Aug......	92½	70	81¼	12·34
Sept......	89	64	76½	11·77
Oct.... ...	92	62	77	0·03
Nov.. ...	84	47	65½	0·03
Dec.......	78	49	63½	—
Jan.......	82	34	58	0·05
Feb.......	89	54	71½	0·01
Mar... ...	92	54	73	0·95

In the Sanitary Report for 1861, the following remarks appear about Palaveram :—" That cholera has originated in Palaveram during the last two years (1859-60), and that these as well as the imported cases have been very severe and fatal. Further, it seems probable that the immunity from this disease in an epidemic form which this station has hitherto enjoyed, is owing to the general healthiness of the native population, and not to any specific influence which the locality possesses over the particular poison of cholera, hence it is very important that every means should be used to keep the station in as favorable a state for preserving it healthy, otherwise there is reason to fear that Palaveram will lose its place among 'exempted or refuge villages.' Its climate is undoubtedly injuriously influenced by its being situated immediately under, and on the north-west side of, a small range of hills, which prevents the free access of the sea breeze to a great part of the station, particularly to most of the houses occupied by the European officers; besides some of these houses are situated so close to the hills as to be fully within the influence of the heat radiated from

the masses of rocks of which they are chiefly composed. * * * * Fortunately from the position of the bazaar, the native portion of the community is removed from the injurious influence of the hills, otherwise Palaveram could never have enjoyed so enviable a notoriety for healthiness. Particularly during the hot season when its influence is most beneficial, the sea breeze blowing from the southerly direction has free access to the bazaar, the European Veteran Company, and the Pensioners' lines, while most of the houses of the European officers are shut out from it by the hills. This explains what to many seems so strange, that Palaveram, so notorious among European officers for its great heat and oppressive climate, should be so healthy. Mere heat does not necessarily render the station unhealthy, but had the native portion of the community been located where the European officers are, the want of a free circulation of air through their narrow and crowded streets would have led to baneful results." Certain removable obstacles to the free circulation of pure air in and around the Cantonment are pointed out, and the steps taken to bring them to notice with (alas) the usual results.

Lines.—Following the order usually observed in annual reports, the position of lines (which answer to barracks in European corps) and hospitals will next engage our attention, and I know of little in a sanitary point of view more deserving of it. The Kamptee lines appear to have been described in a former report, so little is said regarding them in that for 1849. Officers for the day were required by regimental orders to attend particularly to the state of the lines, and to make every sepoy responsible for the cleaning of the trench and road in front of his hut.

At Saugor the regiment was for some months under canvas till new lines were built " on raised and well drained ground in the centre of the Cantonment." They consisted of parallel rows separated by broad lanes at right angles to the main road. The huts were "roomy substantial dwellings, constructed of stone and mud and roofed with tiles."

The lines at Seetabuldee were similarly situated with regard to elevation and were about 150 yards in rear of the barracks (this I take to be the place of arms), "the huts ran in parallel rows, were small, out of repair and badly ventilated."

At the second occupation of Kamptee by the 23rd, it was hutted in the centre of the Cantonment, and the lines though low, were considered healthy. The huts were of the usual (Madras) description, in rows, separated by streets, small, badly ventilated, built of mud, and tiled.

At Russelcondah the lines occupied "the base of a hill gradually sloping to the south, where they are bounded by a river, the huts in this situation were low, and," adds the medical officer, "I am given to understand are under water during the monsoon—those situated nearer the hill were much higher and consequently dry. The streets narrow and dirty, drainage bad, huts very irregular (in this respect differing from the geometric simplicity hitherto noted at other stations), low, (here the resemblance reappears), badly ventilated, built of bamboo mats, plastered with mud, or wattle and dab thatched with grass."

In Rangoon we learn that the sepoys' huts were elevated about 18 inches from the ground with a flooring of parallel "bamboos which prevented them from being effectually swept and kept clean below the floor, and sleeping so close to the ground in such a moist climate as that of Burmah, was likely to occasion fevers, bowel affections, &c." The huts were composed of plaited bamboo matting, unplastered, thatched with leaves of a variety of the palm. Each hut was 15 feet square within, the side walls being 6 feet 8 inches in height, and was intended for the accommodation of eight men, but at the time the second annual report was written at Rangoon, each hut was occupied by six men. As this appears the first station at which the dimensions of huts are given, we find that each sepoy had a cubical space of 185·6 feet and a superficial area of 28 feet when he had seven comrades, and 247·5 feet of cubical space, and 37 feet of superficial area when these had been reduced by *nostalgia* and *beri-beri* to five. These figures may be contrasted with the 648 feet of cubical space and 36 feet of superficial area ordered by the Government of India in later years for native male criminals in jails.

There were no huts for the men on the arrival of the regiment at Palaveram, and they were accommodated in tents for some time. Huts were since built close to the station bazaar, and the medical officer states that had he been consulted in the selection of a site, he would have recommended a different one. "At present," he continues, "the huts of

the 23rd Regiment, those of the Native Infantry Depôt, the station bazaar and native town, are all crowded together. It may be in some respects a convenience to the sepoys having their lines near the bazaar, but the crowding together of so many native habitations is, I think, objectionable, and this might have been avoided by selecting a site for the regimental lines at the other end of the station, they would there also have been nearer the place of arms and hospital."

The Pootoor lines and hospital occupied by this regiment at Trichinopoly have been described in a previous number of this journal.* The last annual report says, "the huts are constructed on a plan which obtains throughout the Presidency, and several defects in them could be pointed out; but as any representation to remedy these would necessitate the huts being pulled down, no steps have been taken."

Hospitals.—That at Kamptee is described as "very airy and comfortable, its only imperfection is its close vicinity to the huts, rendering it a business of some difficulty to keep the slight cases from spending their time in them between the hours of the medical visit."

At Saugor the sick were accommodated in a stone building paved with slates, well situated on hard, stony, sloping ground near the centre of the Cantonment. The centre room or ward was 108 feet $\times$ 20 $\times$ $17\frac{1}{2}$; laboratory well furnished with shelves, and more comfortable and convenient than similar rooms in the generality of native hospitals. The whole building was thoroughly ventilated and yet admitted of being well closed against the cold; it afforded room for forty-eight cots without any crowding or risk of having patients in currents of air. The cook-room and privy seem to have been exactly opposite to each other, which is not so bad as having them adjacent, as in the 23rd Hospital of the present day. "The very usual objection, however, is particularly applicable to this hospital, it is so close to the site intended for the lines, that it will be always difficult to keep the patients from slipping out to their families. The hospital is without any enclosure."

At Seetabuldee the barracks and hospital formed one building, "surrounded on all sides by an open verandah, and

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* Vol viii. p. 326.

ventilated by doors and windows placed opposite each other." The wards could accommodate about sixty patients.

The second hospital occupied at Kamptee was "situated on an elevated piece of ground on the right bank of the Canan river, and about four or five hundred yards north of the lines. It consisted of two wards, each capable of accommodating thirty patients. There was no enclosure to the hospital, and as there were twelve doors to it, it was "utterly impossible for one sentry to prevent the patients (if so inclined) absenting themselves, more particularly as there is [was] an arrack shop convenient to the hospital, which is a great temptation to the men."

The hospital at Russelcondah, surrounded by a five feet wall and capable of accommodating fifty patients, was situated at the base of a hill adjacent to the lines. It consisted of two wards built at right angles to each other, with an open verandah in front and rear.

In Rangoon the hospital (of plaited bamboo matting unplastered) consisted of a detached building 117 feet × 20 × 15½ feet, the main ward was "raised on piles to a height of 7 feet," and below this "a ground ward" had been formed "of the same breadth of course as the upper ward, but only 80 feet in length." The building was capable of being well ventilated, and was liberally supplied with glazed doors and windows, and rooms which were set apart for Surgery, Store-room, &c. At first there was no cook-room, and the patients were in consequence absent for several hours daily, but one was subsequently built.

The ground on which the hospital stood at Palaveram was low and in wet weather swampy, and there was no road leading to it. It consisted of one large ward with a verandah in front and rear, and a small room at either end of each verandah.

Duty and Employment.—Throughout the seventeen years, with the exception below noted, no complaint is recorded regarding the severity of the work in Cantonment. Even when it is said that the sepoys have had one night in bed out of every seven, it should be taken *cum grano*, for after all a day of guard or of orderly duty is a day of which the greater part is spent in sleep.

"I rejoined the regiment," says a medical officer in 1854, "as it was marching out of Saugor on the 1st November. It

had been raining almost incessantly for three days previous to leaving Saugor, and it continued to rain for three days afterwards. We reached the iron bridge at 10 o'clock, where we were ankle deep in black mud and slush, the weather began to improve, and we marched about a mile and a half, where we encamped on a fine open and tolerably dry spot of ground, and halted to allow the families of the men to come up. The road from Saugor to Jubbulpore was in a most wretched state the whole way, and more utter misery and distress amongst the families and followers of the regiment I never witnessed. We reached Jubbulpore on the 22nd, marched the next day to Nerbudda river, and encamped on the left or southern side of that river. Up to this period we had no sickness to speak of, though the men had been worked hard, and their appearance and condition manifestly indicated they had undergone much labour and fatigue. We were occupied two entire days in getting the families and baggage across the river. The thermometer in the morning was 36° F. (4 degrees above freezing point), and the same day at noon in the sun's rays the mercury rose to 124°. The men in fatigue parties, which were relieved every four hours, working hard (in assisting the bandies across the river) frequently up to their waists in water." Nearly a third of the men were subsequently in hospital from fever and bowel complaints, and their ailments were aggravated by their not being able to get their food with regularity. "After crossing the Nerbudda, the march to Seetabuldee was prosecuted without a single halt. The stages averaged from ten to twelve miles a day, but many of the men after arriving at the halting ground, went back to the last stage to help their families into *(sic)* their bandies."

At Seetabuldee duty was rather hard since the Rajah of Nagpore was gathered to his fathers, as two companies under a European officer were furnished daily to the city, and the men had, in consequence, one night weekly in bed. The very great increase of admissions into hospital (1,049 against 538 in the preceding 12 months) was, in a great measure, attributable to the march of the head-quarters of the regiment in wet weather. A year later (1855) four companies escorted treasure to Mirzapore from Kamptee, and were so employed for three months and a half; no casualties occurred during the march, but the men suffered severely on their return with diarrhœa, and an officer accompanying

the detachment had an attack of hepatitis, which nec… tated his proceeding on sick certificate to Jubbulpore.

The average strength, sickness, and mortality are embo… in the appended tabular statements.

Principal Classes of Disease.—The following tables sp… for themselves.

Admissions and Deaths arranged in two quinquenni… periods and a broken period of 21 months; accordin… to the old classification of Diseases.

	1849-1853-54.		1854-55 to 1858-59.		From 1st A… 1859 to 31… Dec. [illegible]	
	Aggregate strength. 4137·5.		3931·5.		1456.	
	A.	D.	A.	D.	A.	D.
Fevers	929	5	1530	26	284	1
Eruptive Fevers	27	...	7	...	6	...
Diseases of the Lungs	33	6	83	3	38	4
" " Liver	4	1	7	...	1	...
" " Stomach and Bowels	215	4	627	11	349	7
" " Brain	29	2	21	2	11	..
Epidemic Cholera	2	1	27	11	2	2
Dropsies	12	1	77	13	280	7
Rheumatic Affections	179	...	238	1	144	...
Venereal and Diseases of the Genital Organs	78	...	94	2	68	...
Abscesses and Ulcers	367	1	546	1	169	...
Wounds and Injuries	149	...	262	...	45	...
Diseases of the Eye	123	...	112	...	18	...
" " Skin	38	...	226	...	150	1
Other Diseases	55	9	96	5	62	2
Total...	2240	30	3953	75	1627	[illegible]
Ratio per one thousand	541·4	7·25	1005·4	19·07	1117·4	17[illegible]

Admissions and Deaths from 1861 *to* 1865, *arranged according to the new classification of Diseases.*

	Strength 3167.		Ratio per 1,000 of	
	Ad.	D.	Admissions to Strength.	Deaths to Strength.
Miasmatic diseases.	904	43	285·44	13·57
Enthetic "	80	0	25·26	0·00
Dietic "	4	0	1·27	0·00
Parasitic "	62	0	19·57	0·00
Constitutional "	19	3	5·99	0·95
Local "	319	5	100·73	1·57
Developmental "	60	0	18·94	0·00
Violence, &c.	115	1	36·32	0·32
Total...	1563	52	493·52	16·41

At Kamptee in 1849, "neither emetics nor saline mixture were used in any stage of intermittent. Common purgatives were employed freely when necessary, but no purgative was given unless there was some decided evidence of its being required. Bark and Quinine have been found wholly unnecessary even in very severe intermittents. Our sole reliance during the year has been upon a powder composed of impure phosphate of lime and sulphur in the proportion of ten grains of the latter to one of the former."

At Saugor in 1851-52 "fevers were more prevalent than any class of diseases, an emetic and a purgative sufficed for the cure of a few cases, but by far the greater number required an antiperiodic—bark occasionally succeeded, but by far the most efficient and certain remedy was quinine to the extent of from 18 to 24 grains in divided doses before the expected return of the disease. Relapses were rare, and the only complications were slight cerebral affections and diarrhœa." During the first nine months embraced by the report for 1852-53, 504 cases were under treatment, of which nearly a half were slight cases of fever. Fevers and rheumatism of an obstinate character were the prevailing diseases in 1853-54. The very great increase of admissions in 1854-55 was, as before stated, attributed to the march of the head-quarters in wet weather; fevers, rheumatism, abscesses and

ulcers, contusions, diarrhœa and ophthalmia were the prevailing complaints; they presented nothing peculiar in character. The same observation regarding them recurs in the report for 1855-56.

A large number of admissions under the heads of dysentery and diarrhœa occurred on the march from Kamptee to Russelcondah (in the year succeeding) principally amongst the Bengalees, who attributed the disease to the use of rice which they had not been accustomed to, wheat flour being too expensive for them. Cholera prevailed (in Kamptee) during the months of April, May and June. During its prevalence "there were great and frequent changes in the weather, the wind was changeable, and at times blowing with great violence, frequent dust storms, considerable electrical disturbance, sometimes cloudy with drizzling rain, at other times close and sultry, sun's rays intensely hot." Fevers and chronic rheumatism are mentioned as principal diseases of Russelcondah in 1857-58.

Of 1297 admissions in 1858-59 in Burmah, nearly one-fourth were from diarrhœa, about one-sixth arose from fever, and one-twentieth from rheumatism. There were also 56 admissions from beri-beri, which disease is thus described in the report for 1858-59 by Dr. R. Wilson, the present able and energetic Zillah Surgeon of Tinnevelly :—

"The disease of burning of the soles of the feet appears to be endemic in Burmah, and principally to affect natives of Southern India. It is of an asthenic and chronic character, the vital powers being much depressed. The disease generally commences with weight, numbness and throbbing of the feet and legs, afterwards a burning sensation, chiefly confined to the soles of the feet ; this pain is frequently of a remittent character, being gradually more severe at night. Tongue generally coated with a thin whitish fur at the back and centre ; appetite impaired ; bowels irregular ; urine frequently high coloured. Pulse invariably quick, varying from 100 to 150 and weak, this small, quick, thready pulse is a pathognomonic sign of the disease ; or the pulse may be quick and weak with the interval obscurely defined. There is also dyspnœa on exertion. After a time, varying from a few weeks to as many months, the patient appears to lose power over the motor nerves, and proper control is thus lost over the movements of the lower extremities, the patient totters in his walk, he also looses flesh.

"As the disease advances, his feet and hands less frequently become œdematous, effusion into the cavities of the chest takes place, and the patient expires suddenly, or colliquative diarrhœa closes the scene. Medicine or diet seems to exert little or no influence over the disease when once developed. Quinine, iron, zinc, fish oil, petroleum, arsenic, alteratives, diuretics and blisters to the spine with stimulating frictions to the affected parts have all been used without producing any apparent beneficial influence over the disease. At present the only remedy which appears to exert any power in arresting the progress of the disease is a speedy removal to the continent of India, where a few months' residence with his accustomed food, and associations, is generally sufficient to restore the patient to good health."

"On the arrival of the regiment from Burmah," writes the Officer in medical charge in 1861, "at the beginning of the present year most of the native ranks looked sickly, many were suffering from that class of symptoms which has hitherto been denominated beri-beri, and many others were anxious to make out that 'the Rangoon disease' had so disabled them, that they were unfit for any further service. The latter were, of course, men who had served fifteen years and upwards, and who consequently, on being discharged would be entitled to a pension. I have remarked that, as a general rule, the most inefficient sepoys in this Regiment as regards their natural physical conformation, are to be found among those who have not served more than five years." After the discharge of men considered unfit for further service, "the Regiment was particularly healthy, the largest number of admissions were from rheumatism, intermittent fever and atrophy, the first and third of these occurred almost entirely in men who had contracted the disease in Burmah, the generality of the fevers were slight, most of the cases occurred among men who had been on leave, and contracted the disease on their journey to and from their native villages."

At Trichinopoly, in 1862, the admissions were principally from zymotic diseases, as intermittent fever, diarrhœa, dysentery, cholera and rheumatism. These admissions were more frequent from September to December. In 1863 and subsequent years the principal diseases treated were of this class, and the subjoined table from the last annual

report exhibits the number admitted under the above heads during the last three years.

YEAR.	1863.	1864.	1865.
Average strength.	670	638	649
Fevers..........................	137	83	48
Rheumatism......................	20	20	20
Dysentery.......................	17	7	12
Cholera.........................	34	5	5
Diarrhœa........................	38	11	14

The percentage of sick to strength has fallen from 62 in 1863 to 30·5 in 1865.

Epidemics.—Children in the regimental lines at Saugor suffered from influenza in March 1853, and from April to June in the following year, and at the same station small-pox broke out among them. In 1855 at Kamptee they had chicken-pox and measles.

"Cholera in an epidemic form prevailed in the lines at Kamptee in April, May, and June 1856. Twenty-three cases occurred among the men of the Regiment, out of which number nine proved fatal. One officer died from the same disease." After detailing the characteristic symptoms, the medical officer says, "The treatment consisted in the administration of Calomel gr. x., Opium gr. i. on admission, wine and brandy, frictions and hot sand to the extremities, sinapisms to the stomach, and a mixture composed of the following ingredients: ℞. Æther Sulph. ʒ vi., Sacchari ʒ ii., Aquæ ℥ viii., fiat mist. ℥ ss. to be given alternately every 15 or 20 minutes with brandy or wine. Cold water in small quantities to assuage thirst."

Cholera spasmodica occurred again as an epidemic in December 1862 at Trichinopoly. "The weather had been cloudy and drizzling from the beginning of the month; and the atmosphere oppressive. One of the earliest fatal cases was remarkable, as the patient recovered from the collapse and passed feculent motions, but died three days afterwards coma-

tose. The patient, since the access of cholera, had not passed any urine, but on the fourth day a small quantity was drawn off. The coma was preceded by difficult spasmodic breathing and vomiting of greenish pasty matter. It was observed that the patients who suffered from this spasmodic breathing almost invariably died."

The families in the lines appeared to suffer severely from the epidemic. They preferred to use their own remedies, and very few applied at the hospital for European treatment. It is to be regretted also that many of the sepoys concealed their ailments as long as they could, and were generally brought into hospital in the collapsed state, though the Commanding Officer, at my suggestion, repeatedly issued orders that men should come to hospital at the onset of the disease. The regiment located in these lines always suffers more from the annual visitation of cholera than those in the other lines in the Cantonment.

The majority of cases were treated on the plan recommended by Dr. Morehead of Bombay. The horizontal position, the application of moderate warmth, dry friction with the hand, occasional small quantities of cold water, sago with wine, one drachm doses of aromatic spirits of ammonia every hour during the collapse, and blue pill, quinine and camphor in small doses when re-action sets in.

The fatal termination in many cases could be directly and positively attributed to the patient having been raised up by the orderlies into a sitting posture (contrary to stringent directions) after reaction had set in, but while the heart was yet too weak to bear the change of position. The success of the treatment might be inferred from the unusually large number of recoveries, the total treated on this plan was 21, deaths 4; giving the mortality rate $\frac{1}{5}$ to the number admitted or 19·04 per cent."

Cholera reappeared in December 1863, and the facts relating to that outbreak are condensed as follows in the report for that year. (1) Of 24 cases only 3 applied for treatment within the first hour of the attack; 6 within two hours; 3 within four hours; 5 within five hours; 3 allowed twelve hours to elapse, and 2 did not come into hospital. (2) Cases occurred in all the companies. (3) Of 22 cases treated in hospital, 6 recovered, 14 died in the stage of collapse, and 2 after reaction had set in. (4) Of 4 cases in which Dr.

Mudge's turpentine treatment* was tried, all proved fatal. Of 8 in which a mixture of chloroform with tincture of opium, aromatic spirits of ammonia, tincture of ginger, was given, 2 recovered and 6 died. Of 10 cases in which this mixture was given alternately with Condy's solution of the alkaline permanganates, 4 recovered and 6 died.

Mortality.—According to age and service.

Of 182 deaths of Hindoos and Mussulmans in hospital,

46	occurred in men of	35 and under 40	years	of age.
35	„	„	40 and under 45	„	„
33	„	„	30 and under 35	„	„
28	„	„	25 and under 30	„	„

The largest mortality appears to have taken place in men of from 15 to 20 years' service, next in those of from 10 to 15 years, and next in those of from 20 to 25 years.

Vaccination.—In 1849 "very little was done towards vaccinating the followers of the corps, owing to the difficulty of keeping up the supply of vaccine matter." In 1850 no opportunity was neglected, but the difficulty of procuring lymph at Kamptee was considerable. During the march of the Regiment from this station through Jubbulpore, a vaccinator went to the camp for two days operating on all those who could be brought to avail themselves of the boon, but the natives, with their usual obstinacy, refused in general to avail themselves of the boon. The Commanding Officer sent havildars repeatedly through the camp to order the people to bring their children to be vaccinated, but the people were remarkably indifferent to persuasion or order on the subject. In 1851-52 at Saugor no lymph was procurable till February of the last-mentioned year from which vaccination was kept up during the ensuing twelve months. In 1853-54 lymph was obtained from Calcutta, Benares, Cawnpore, Mhow, Hoosungabad, and Kamptee, all of which failed. Some obtained from Futtyghur succeeded. Above 100 cases were operated on in 1854-55 with fair success, but the medical officer observes that "when persons are once vaccinated, it is almost impossible to get them at the hospital on the sixth or seventh day for inspection and extraction of lymph." The difficulty of obtaining lymph is again noted in 1855-56 at Kamptee. In 1856-57 the medical officer was "of opinion that none (out of 17 cases reported)

* See Madras Quarterly Journal of Medical Science, vol. vi., p. 410.

were properly vaccinated, the lymph supplied not being lymph at all but matter from a common pustule." In 1857-58 he "went into the lines to the doors of the sepoys, hoping they might be induced to have their children vaccinated, and the plan succeeded better than having them brought to hospital."

Vaccination was not kept up during the stay of the regiment in Burmah, and on the arrival of the sepoys' families at Palaveram it was attempted but the lymph used had failed. At Trichinopoly in 1862 about 40 children were operated on. Lymph frequently failed in 1863, and when it was obtained from the Civil Dispensary, there was some trouble about getting children, as either their parents were on guard, or orders were misunderstood, or orders did not come through the proper channel, or no orders were given, and a series of other excuses, but they were gradually surmounted, and from 60 cases the number increased to 204 in 1864. The sepoys are lamentably apathetic in the matter. It was frequently reported that there were no children requiring vaccination in the lines, but as no statement to that effect could be obtained *in writing*, the Adjutant was invariably written to, and some unprotected children generally obtained. In 1865, 58 cases were vaccinated, and the falling off is attributed to there having been but one subordinate attached to the hospital during the year against three in the preceding; to a scarcity of and difficulty in obtaining children from the lines; and to the failure of lymph which could not as before be kept up from the former source of supply in the Civil Dispensary.

The late Lord Palmerston once said, that there were but two things over which the immortal gods had no control—past events and arithmetic—and whatever doubts there may be regarding the figures in the subjoined tables A and B, it is clearly not my province to do more than summarise the deductions from them.

1. For sixteen years and nine months, the total strength (Europeans excluded) was 12,846, the total treated 10,082, and the total of deaths in hospital 189.

2. The average annual strength may be set down at 766·9.

3. The average treated annually at 601·9.

4. The average annual deaths in hospital at 11·28.

5. The percentage of deaths in hospital to strength 1·47.

6. The percentage of deaths to treated 1·87.

7. With the above annual strength (766·9) and average treated (601·9) the percentage of sick to strength would be 78.

8. During the tour of service in Burmah the mean strength was 886, and the average yearly treated 1,063, the percentage of sick to strength was close upon 120—(119·97.)

9. There were 48 deaths in the regimental hospital and 25 out of or in other hospitals during the above tour of service. The percentage of deaths to strength and to total treated would be respectively 8·23 and 6·86.

10. During this period and the following year 219 were pensioned and invalided. The number pensioned and invalided during the thirteen other years (for which figures are available) was 257—so that while the invaliding and pensioning on ordinary Indian service was at the rate of 19·7 per annum, it rose to 54·3 per annum during and immediately after service in Burmah.

11. The European strength may be set down at 12·5 per annum. The deaths of six European officers are recorded since 1849; in other words European officers have died at the rate of one nearly every two years and ten months. They appear to have been sent away on sick certificate (to Europe principally) at the rate of one per annum.

12. There are no records concerning the officers' wives and children, but as far as I have been able to ascertain from the older officers, there has been one death among the former and three among the latter since 1849.

13. Lastly, about the non-combatants, (I don't mean those who incur the hazards of battle about once in a life time, but those *who do battle daily* exposed to the contagions and infections of hospitals) I observe that there were no less than 23 officers in (temporary or permanent) medical charge of this regiment during the period under notice. Of these six are on sick certificate, seven are dead, one has retired from the service, while the rest ("what shadows we are—what shadows we pursue") are in harness in India.

TRICHINOPOLY, *June* 1866.

A.

23rd Regiment W. L. I.

Statement showing the Strength, Sickness, Mortality, Number Invalided, Pensioned, &c., from 1849 *to* 1865.

	1849	50-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60 9 months.	61	62	63	64	65
	Kamptee.	Saugor.	Saugor.	Saugor.	Saugor.	Seetabuldee.	Seetabuldee and Kamptee.	Kamptee, Kimedy, Russelcondah.	Russelcondah.	Rangoon.	Rangoon.	Rangoon.	Rangoon, Sea, Palaveram.	Trichinoploy.	Trichinopoly.	Trichinopoly.	Trichinopoly.
Average yearly strength. Europeans.	12·25	15·25	0	15·5	13·	14·75	13	12	14	13	9	8	12	22	12	7	5
Average yearly strength. Natives	908	778·25	825	825	802	821	814	803	743	763	840	616	489	684	680	631	649
Total treated	422	400	333	591	550	1061	642	561	384	1297	1161	466	319	388	452	272	205
Do. Discharged cured	401	362	324	577	532	1033	617	521	338	1249	1101	441	312	353	409	258	188
Do. Deaths in hospital....	7	11	7	2	6	14	8	25	8	22	19	7	4	11	25	6	7
Do. Deaths out of or in other hospitals.......	2	0	0	1	0	0	0	2	1	0	17	11	14	2	2	1	6
Do. Invalided................	3	0	0	1	0	0	6	9	17	19	0	0	0	0	0	0	0
Pensioned	9	15	0	0	1	1	7	14	18	24	0	111	65	72	11	67	6
Discharged on account of disease.	1	0	1	0	1	0	0	0	0	0	0	0		12	3	13	1

B

Table exhibiting the Diseases under which Deaths in Hospital were returned from 1849 to 1865.

	Abscessus.	Aneurisma.	Anasarca.	Apoplexia.	Asthma.	Atrophia vel asthenia	Beri-beri.	Bronchitis.	Bubo.	Cancrum Oris.	Catarrhus acuta.	Cholera Spasmodica	Cynanche trachealis	Diarrhœa.	Dyspepsia.	Dysenteria.	Dyspnœa.	Ebriositas.	Feb. Com. cont.	Febris Intermit.	Febris remittens.	Hepatitis.	Lepra.	Mania.	Nephritis.	Obstipatio.	Paralysis.	Pneumonia.	Phthisis pulmonalis.	Rheumatismus.	Syphilis.	Ulcers.	Venenatio.	Total.
1849.	...	...	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...	...	...	2	...	...	...	1	...	1	...	1	...	...	...	...	7
1850-51.	...	2	1	...	...	...	...	...	...	1	...	1	...	2	1	1	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	11
1851-52.	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	1	...	1	...	...	...	1	...	...	1	...	...	...	1	...	...	...	...	7
1852-53.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	2
1853-54.	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	1	...	1	...	...	...	...	...	...	...	6
1854-55.	...	...	1	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	7	1	...	...	...	...	...	1	...	...	...	1	...	...	14
1855-56.	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	4	...	...	...	...	...	...	...	...	...	...	...	...	...	8
1856-57.	...	...	2	...	...	4	...	...	...	...	1	9	...	...	...	3	...	...	1	3	...	...	...	...	...	...	...	...	...	2	...	...	...	25
1857-58.	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	1	...	2	2	...	...	...	...	...	...	...	...	...	...	...	1	...	8
1858-59.	...	...	4	...	...	1	3	...	1	...	1	...	...	6	...	1	...	...	...	4	...	...	...	...	...	...	...	...	...	1	...	...	...	22
1859-60.	...	...	1	...	...	1	5	2	...	...	...	1	...	4	...	1	...	...	...	2	...	...	1	...	...	...	...	...	...	1	...	...	...	19
1860.	...	...	...	...	...	1	1	...	...	...	...	1	...	1	...	1	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	7
1861.	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	4
1862.	...	...	...	...	...	...	...	...	...	...	...	9	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	11
1863.	1	...	1	...	...	...	...	...	...	...	...	20	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	25
1864.	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	6
1865.	...	...	1	...	...	...	...	...	...	...	...	3	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	7
	1	2	14	2	1	7	9	3	1	1	3	51	1	15	3	10	1	2	5	26	7	1	1	1	3	1	3	1	5	5	1	1	1	189

ART. VIII.—*Report on the Fever which prevailed throughout certain Districts of Western Malwa in* 1865. By H. C. BRODRICK, Esq., M.D., 1st Regiment, Central India Horse.

(Forwarded by the Principal Inspector General, Medical Department.)

From HENRY C. BRODRICK, M.D., *Assistant Surgeon, 1st Regiment, Central India Horse.* TO THE AGENT TO THE GOVERNOR-GENERAL FOR CENTRAL INDIA.

AUGGUR, *Februarg 7th*, 1866.

SIR,

I have the honor to submit to you a report on the fever that during 1865 prevailed so extensively, and proved so fatal, throughout certain Districts of Western Malwa.

The report embodies the result of inquiries I made personally in the Districts where the disease prevailed, and it is imperfect for several reasons.

1st.—Because I could only make inquiry when this particular malady was matter of history, when it had almost entirely passed away.

2nd.—Because the persons examined were for the most part rude and ignorant, and were naturally inclined to exaggeration.

3rd.—Because they were apt to confuse two separate maladies under which they had recently smarted, namely Cholera and the Fever in question.

4th.—Because they were prone to say what they thought they were wanted to say, and jumped readily at the suggestiveness of anything like a leading question.

My inquiries were made at Gungrar, at Seeta Mhow, and the neighbouring villages, at Mundesson, Mulhargurh, Jowra, Sulana, Rutlaum, and Kachrode. At most of these places the disease was known as "Gujrati Beemari;" by the educated Mussulmans of Jowra it was described as "Yerkan" or "Peelia," both terms indicating Jaundice; whilst at Oojein it was called "Bèlia."

It is called "Gujrati Beemari" because it is believed to

in its growth by the branches it gives off, th
analogous to the breaks or intermissions i
an ordinary fever. But a twining plant or
gives off no branches, it grows on and on
fications. So, this new kind of fever goes
without any intermission, and thus it is

All the natives whom I have questioned
that the disease is a new one to Malwa, but
same time that it has been described in bo
prevailed elsewhere.

I proceed to sketch *their* account of this m

It was a fever that appeared soon after the
rains, it lasted ordinarily three days, withou
career. After three days the patient's breath b
and so he died.

The whites of his eyes became yellow; hi
yellow; his sweat was yellow, and it stain
yellow.

The urine was high colored, the bowels c
skin was very hot.

Or the patient vomited blood, or had purg
matters, or he passed worms by stool or vomi

He had pain under the ribs sometimes, on
the other, this pain made him catch his breat

There was great discrepancy in the several accounts of the vomiting and purging of worms. I shall allude more to this anon.

At Gungrar there are two thousand five hundred houses; here, during and subsequent to the Dèwalli festival about three hundred men, women, and children died of the "Gujrati Beemari." In the current January, a case would occur now and then, but very rarely, for the disease had steadily abated after the setting in of the cold season.

No Hukeems lived at Gungrar, there was no remedy known for the disease, people practised one upon another, some gave one remedy and some another, all were alike useless.

At Seeta Mhow I made very minute inquiries, but was informed that no cases had occurred in the city itself. It had, however, ravaged the villages of *Akia* and *Laktullie*, close by, whither I proceeded to make inquiry on the spot.

The village of Akia lies only four miles distant from Seeta Mhow. Before the month Bhadon it had contained fifty-houses. The fifty had now dwindled to twenty-five. Twenty-five houses had been desolated by this dreadful scourge, and the crumbling walls of the crazy, roofless and tenentless huts, where the *Dhatoora* and other wild plants were already springing up, formed one of the most miserable pictures I had ever gazed upon.

The Thakoor of the village, Luxumon Singh by name, a kinsman of the Rajah of Seeta Mhow, told me how twenty-two persons, members of his family and household, had been swept away since the month Bhadon, how of these twenty-two souls, three were his own brothers, one a nephew, and one a grand nephew, and how he himself had suffered also from the malady.

He said that over ninety persons altogether, inhabitants of Akia, had died from the new fever, besides twenty dying from cholera, and in depicting the ruin that had overtaken his village, he used the eloquent expression that Sir John Malcolm remarks upon, as used in certain parts of Malwa to express the ruin that marked the track of the Pindary freebooters—he said his village was "*bèchiragh.*"

I was informed by some of the villagers at Akia that the fever underwent relapses. A man would apparently recover and be again attacked, and that, thus, a man had been known to have eight several seizures.

At Akia some of the fever patients are said to have had purging and vomiting of blood and worms.

I examined the village curiously. There was nothiug unusual about it; it was surrounded by fields of young poppy and jowar, and it had no jungle near it except towards the west, where was a dense clump of prickly pear.

The water supply was from a 'kutcha' well, a section of which showed the ordinary trap formation that prevails through the district, but lacking the bands of sandstone flags that obtain at Seeta Mhow. The water was fresh and good to the taste, there were, at my visit, ten feet of water in the well only, for the irrigation of the opium fields was going on busily at the time.

In the hot season, the Thakoor told me, there would be at least fifteen feet of water in this well.

Luxumon Singh himself lives in a little mud fort in the village, which bears a partial enfacement of sand-stone flags.

On my asking why this facing with stone was incomplete, he said it was because "all the masons had died off since the month Bhadon."

The village of Laktullie is about six fields-breadth distant from Akia.

It had suffered in a less degree from fever, ten houses having been desolated out of a total of one hundred houses.

Thirty-five souls had perished from the fever, and twenty from cholera. There was a history of purging and vomiting of blood and of worms at this place, as at Akia.

Several of the kinsmen of the Thakoor, Bhugwunt Singh, had been swept away by one or the other of the concurrent epidemics of fever and cholera.

During the sickly season provisions were very dear in these villages, eight kutcha seers—equal to eight pounds—of atah selling for one rupee, and other cereals and pulses being equally costly in comparison.

The same story met me wherever I made inquiries, the same kind of disease similarly fatal; and the same tendency was everywhere shown by my informants, to mix up the epidemic fever with the epidemic cholera, in describing the symptoms of the former disease.

At Rutlaum I examined the native doctor of the Charitable Dispensary there, Anund Rao, as to the symptoms of the "Gujrati Beemari," and at last got an intelligible account of it, for he had treated six or seven cases of it, and he is a shrewd and intelligent man, gifted with a good deal of plain common sense.

There was no purging or vomiting of worms in the cases Anund Rao had seen, no purging of blood or vomiting of it, but there was cough, and *an expectoration of matters tinged with blood.*

The cases were of ardent fever without remissions, and were attended with congestion of the liver, producing pain under the ribs and jaundice, and with congestion, and probably, at times, with inflammation of the lungs producing difficulty of breathing, cough, *and bloody expectoration.*

The vomiting and purging of worms, described to me as occurring at various places, I explain thus.—Wherever I found the story of these symptoms, I found the story of cholera too, both the "Gujrati Beemari" and cholera prevailing *pari passu* at the same time and place, and the symptoms of the two diseases were confounded very naturally by the terrified survivors.

Now the vomiting and purging of cholera and choleräic diarrhœa, during the prevalence of those diseases in the months of June, July and August at Auggur, were attended with the voiding of these loathsome parasites—a new complication in my experience, and an unknown one in that of all the medical friends I have consulted *in hâc re.*

In the wing of the 28th Bombay Native Infantry under my charge at Auggur there were forty-one cases of cholera and diarrhœa admitted to treatment, between June 15th and August 10th, 1865.

In twenty-two of these cases, worms, of the kind known as "lumbricus teres," similar in appearance to the common earth worm, were voided by vomit or stool, or by both.

In one case of choleräic diarrhœa, occurring in a child aged nine years, no less than twelve large worms were voided. In each of two other cases ten of these disgusting tenants were ejected, one of the patients recovering, and the other dying.

I have no doubt in my own mind that this is the true explanation of the case—that cholera and the "Gujrati Beemari" prevailed side by side—that worms were voided in the cholera cases, as they were at Auggur, and that thus the objective symptoms of the two diseases become confounded one with another.

At Gungrar and Akia I had the opportunity of seeing three cases of the "Gujrati Beemari," all convalescent; there was no history of the voiding of worms in any of these three, they were cases of a very low form of remittent fever *without remissions*, if I may so express it, attended by engorgement of the liver and spleen, producing jaundice and pain in the side. There were no chest symptoms recognizable in any of the three cases, but then they were all in the stage of convalescence, when this complication, if it had existed, had passed away.

The vomiting of blood was, I believe, merely the bloody expectoration of "Pneumonia" (inflammation of) or of congestion of the lungs.

I have often been told by the friends of my own patients, that sick men have had vomiting of blood, when, on examination, such has resolved itself into the hawking up of matters tinged with blood, the very common attendant of inflammation or congestion of the lungs.

A clever Hukeem at Rutlaum who had seen many cases of the "Gujrati Beemari" told me that there had been blood-tinged expectoration in the cases he had attended, with cough and urgent difficulty of breathing; and furthermore, he told me that this same disease was described in certain of the Shasters under the name of "Mookhruckut-shraoo," which means "expectoration of blood."

He, too, told me, that the disease had prevailed in Guzerat, and had spread VIA PALEE to Malwa.

During the past year I have myself treated several cases (occurring amongst syces and mehturs of the 1st Regiment of Central India Horse) in the Cavalry Hospital at Auggur, of such a fever as I believe the "Gujrati Beemari" to have been.

There was continuous wasting fever without any attempt at remissions, lasting for several days, with congestion of the lungs and bloody expectoration, and great embarrass-

ment of breathing, and with congestion of the liver and pain in the side and jaundice. These were very unpromising cases, but they were all cured by the resolute use of Quinine, with animal broths and alcohol, and by close attention to the personal cleanliness of the patients.

It is vain to wait for remissions in such cases in which to give the Quinine.

It must be given early in and throughout the cycle of the case, when the patient will ordinarily recover. To wait for a break in the cycle of the fever is to wait for the dissolution of the patient;—to give the drug in less doses than 10, 15, 20 grains, frequently repeated, is to trifle with the malady. Quinine is as sure an antidote for the bane of such a fever as it is in an intermittent, provided it be given unsparingly.

Briefly: I believe, this terrible scourge, the "Gujrati Beemari," to have been nothing more than a form, a very bad form, of remittent fever,—jungle fever,—with such internal congestions as were evidenced by jaundice, pain in the side, and occasional vomiting—pointing to the liver as the organ intercurrently engaged; or by difficulty of breathing, cough and bloody expectoration—the objective symptoms of inflamed or congested lungs.

The coincident prevalence of cholera with voiding of worms in the choleräic ejecta, has, in my belief, caused the symptoms of one disease to have been confounded with those of another.

As far as I know, there is no evidence of the "Gujrati Beemari" being *contagious*, but I cannot of course speak certainly on this point, until I have had an opportunity of seeing an epidemic of this disease on a large scale.

The yellow sweat that is said to have tinged the clothes of the patient of that colour is no new thing in the history of fevers. In the highly congestive form of the Edinburgh fever of 1843, these symptoms were remarked, and at Swansea, in the autumn of 1865, the occurrence of yellow sweating and jaundiced eyes in certain cases of fever made people think at the first that the veritable "yellow fever" was in England.

An interesting question that occurs to me is, whether or

not this "Gujrati Beemari" be identical with the so called *Palee Plague.*

There is a short notice of the Palee Plague in "Honigberger's Thirty-five Years in the East," which prevailed in the autumn of 1838, as it had done during the three previous years.

The author says that an English physician, Dr. Keir, of Gogo, informed him (a native of Transylvania) that "the English physicians did not agree in their views respecting the plague at Palee: for some of them considered the disease to be a *pestilential fever peculiar* to India, whilst others declared it to be the same plague that was so common in the East, and especially in Turkey and Egypt."

Honigberger himself visited cases of the Palee Plague, and he writes: "The infected died generally on the third or fourth day, and scarcely one amongst twenty recovered." "I saw (he writes) carbuncles, buboes, bleeding at the nose—in one word, all that I had seen in the hospitals at Constantinople."—"I no longer doubted, therefore, that the disease was most virulent plague. It is true that it was not the plague of Turkey, Arabia or Egypt, but one peculiar to India; Palee being a province of that part of Asia."

Dr. Honigberger suffered himself from a slight attack of the plague, the prominent symptoms being *high fever*, with pain and swelling of the glands of the groin, and he was relieved by a profuse perspiration, so profuse, he writes, "that my matrass was wetted through."

He attributed this critical sweat to certain pills he had taken containing "Strychnos Faba Sancti Ignatii"—the bean of a tree of the Strychnos family.

The attack of the disease he attributed to the fact of his having inhaled the malaria of Palee, "generated by the exhalation of the immense marsh, whither thousands of birds and reptiles resort, and which serves at the same time as a depositary for all the substances ejected from the town."

It is very generally believed that the historical plague was a malignant fever, the stress of which was felt in the glandular system, leading to buboes.

The type of Zymotic disease is ever inconstant, and the stress of it may be experienced in any one organ or set of organs; in one series of cases in the lymphatic glands, leading

to bubo; in another in the glands of the small intestine as in true typhus; in a third in the liver and lungs, as in the instance of the "Gujrati Beemari."

Diseases are not entities; they must be studied in relation to each other. The organs of our bodies are so interdependent, that they may any of them suffer in turn when the blood is poisoned by those subtle emanations that are only evidenced by the phenomena of their invasion of certain parts of the great whole.

I do not possess, for reference, the report on Palee Plague, drawn up, I believe, by Dr. Martin of the Bombay Medical Service, but it is my impression that he believes it to have been a malignant fever of an unusually fatal type; and I am confident in my own mind that although the local manifestations of the disease noticed by him may have differed from those I have described as attendant on the "Gujrati Beemari," still that the essential points of the diseases are identical; that they arise from similar causes, are aggravated by hunger, nakedness and dirt, and that the attendant phenomena are dependent on local and peculiar causes.

ART. IX.—*American Notes.* By HENRY KING, A.B., M.B., CH.L., Ex-Scholar, Senior and Junior Moderator, Trinity College, Dublin; L.M. Rotunda Hospital, Dublin; Assistant Surgeon, Madras Army.

SERIES III.

(*Continued from Vol. IX, page* 330.)

35. *Chloroform* v. *Ether.*—Few popular fallacies are more ridiculous than that which attributes the invention of anæsthetics to Sir J. Simpson. Passages occurring even in medical works make it doubtful whether the profession itself is altogether free from the delusion that the eminent Professor's principal claim upon the veneration of his professional brethren and the gratitude of mankind (and still more of womankind,) rests—not upon the services he has rendered to obstetric medicine, but upon his introduction of chloroform as an anæsthetic into the practice of Surgery and Midwifery. In these pages it is scarcely necessary to state that Sir J. Simpson did no more, in this respect, than prove, by a careful series of experiments upon anæsthetics, that chloroform, the anæsthetic properties of which were previously well known, might with safety and convenience be substituted for ether; that his claim even to priority in this discovery is plausibly disputed by a French physician; that the world, unless ether became extinct, could have got on very well without chloroform; and finally, that many French and the majority of American operators prefer and continue to employ ether.

The question of chloroform *v.* ether is not yet decided, and it is not an easy question to decide absolutely. The result of investigation and argument, so far as they have gone, appears to be, that while the risk of loss of life is really trifling when chloroform is used, it is still more inconsiderable when ether is employed. This is a decided advantage to the latter; which is, on the other hand, less convenient on many occasions. In the United States Army, for instance, during the civil war, chloroform was preferred

on account of its greater portability*—so much less being necessary for the production of anæsthesia. In many private consulting-rooms, also, chloroform is adopted. In the Women's Hospital, New York, in the numerous operations for vesico-vaginal fistulæ, &c., &c., which I saw Dr. Emmett perform, anæsthesia, when considered necessary, was produced by chloroform: and the operator assured me one day that having been for years in the constant habit of administering chloroform, both in hospital and in his own "Office" without ever (until the previous day) having met with a single accident, he had come to believe that accidents resulting from this anæsthetic must be the result of mismanagement on the part of the operator. The case which shook his conviction illustrates the difficulty, I may say the impossibility, of determining beforehand the instances in which danger is likely to be incurred, and especial caution should be observed. A lady called upon him in his office for advice. She had inhaled chloroform frequently before; was even in the habit of taking it by herself to induce sleep. On this occasion, nevertheless administered most carefully by a practised operator, it proved all but fatal. Life was with great difficulty recalled by means of artificial respiration. The accident was unaccountable. The only guess that could be hazarded as to its cause was the fact that the patient's system had been, so to speak, saturated with opium; but the insufficiency of this explanation is obvious. From him also I heard of a case which had occurred not very long before in Paris. After Dr. Sims had operated successfully upon a hospital case of vesico-vaginal fistula, Nèlaton called on him to request him to see a very bad private case of his, which he had previously considered incurable by any operative means, and to operate, if there seemed a chance of success. After some months of preparatory treatment, Sims operated, the chloroform being administered by no less a surgeon than Sir Philip Crampton. As he proceeded he noticed a peculiarly congested condition of the vagina, asked if all was right, and found that the patient was *quam proximé* dead. She was restored to life with the greatest difficulty.

* A Military Medical officer told me an anecdote illustrative not only of this statement, but of the ignorance of some of those whom it was found necessary to employ as Army Surgeons in a great emergency. An "Inspector" coming up, while one of his subordinates was cautiously administering chloroform *secundum artem*, himself accustomed to ether, exclaimed "that's not the way to give chloroform," and dashed the anæsthetic freely on the sponge. The patient died.

On the other hand, Dr. Emmett assured me that he had *never* seen any worse result from the administration of ether than vomiting and prostration—and these only after protracted anæsthesia. This agrees with the report of the Boston Committee which investigated the claims of the rival anæsthetics in 1861. A patient certainly did die under the influence of ether, in the New York Hospital, while I was in the United States. One carotid had been divided, and anæsthesia was induced in order to ascertain if any thing could be done. The surprise with which the news was received by the profession showed that such accidents were exceedingly rare. I was told that this was only the sixth on record, as occurring in New York.

36. *Chloroform in Photophobia.*—Visiting the New York Eye Infirmary with Dr. Agnew, the eminent Oculist—one of the few "specialists" of New York—I saw one of the most striking effects of chloroform illustrated; an effect which I had never heard of previously. In cases of phlyctenular, commonly called strumous, ophthalmia, intense photophobia is one of the most prominent symptoms. Putting the patient (generally a child) under the anæsthetic influence of chloroform not only enables the surgeon to ascertain the condition of the cornea while the insensibility lasts, but also completely removes the photophobia—always for a few hours, sometimes permanently. There is as little risk with children as with adult patients.

In connexion with the subject of the last Note, I may mention that Dr. Agnew had used chloroform for ten years in innumerable cases, both for examining and for operating on the eye, without having met with one accident. At the same time he was conscious that he was running a greater risk than if he had employed ether. He felt that with chloroform an accident might occur at any time. He preferred chloroform to ether for three reasons. Firstly, a less quantity of the former is required; ʒi. being nearly an equivalent of ℥iv. of the other. Secondly, ether causes more struggling before the supervention of anæsthesia, which, to a greater or less degree, congests the head; leading to a more considerable amount of hæmorrhage from the structures of the eye. Thirdly, patients awake sooner and more easily from the sopor of chloroform than from that of ether.

37. *Nitrous Oxide as an Anæsthetic.*—In November

1863, one Dr. Cotton, a dentist in good practice, advertised himself on a grand scale, by giving an exhibition of the effects of "laughing-gas" in one of the largest public rooms of New York, which (the admission-fee not being extravagant) was well-filled on the occasion. After some indifferent part-singing, the gas was administered to a dozen or more volunteers from the audience, with the well-known results, which were very amusing but need not be described here. The stage of excitement or exhilaration, which alone is reached in the ordinary use of the gas, is followed, if inhalation is continued, by a state of perfect anæsthesia, sufficiently lasting to permit the extraction of any reasonable number of teeth. This anæsthetic sopor was produced before the audience, and was manifestly suited to the purposes of the dentist. Dr. Cotton stated that he had extracted 6,000 teeth from patients under the influence of nitrous oxide, without their being conscious of any pain. He stated further that he had administered the gas in 20,000 instances without the slightest ill effect in any single instance. Its inhalation is followed by no re-action whatever—by no unpleasant sensation of any kind. There can, I think, be little doubt of the superiority of this anæsthetic to chloroform in dental practice. The dentist, I may add, is more exposed than other practitioners who use anæsthetics to the terrible risk of unfounded accusations by malignant or hysterical women. This risk would be obviated by the use of nitrous oxide.

The gas should be carefully made and pure. It should also be freshly prepared. From four to five gallons (contained in one large bag) will be sufficient to produce anæsthesia.

I must mention that Dr. Cotton's immunity from accident in the use of laughing-gas in dentistry is not universal. Ill effects resulting from its employment he would, no doubt, attribute to careless preparations of the gas, or to its having been kept too long before being inhaled. The following case occurred while I was in New York, and not very long after I had heard Dr. Cotton's eulogium upon nitrous oxide.

Samuel P. Sears, a merchant, aged 26, died at the "dental establishment" of J. Burnett, from the effects of laughing-gas, which had been administered for the purpose of extracting a tooth. Deceased had been suffering for a long time

from "bronchitis and hæmorrhage of the lungs" and occasionally from tooth-ache. He went to Mr. Burnett's, inhaled (at his own request) nitrous oxide gas, and had the offending tooth extracted. He had apparently recovered from the effects of the anæsthetic when he suddenly complained of being ill. A Physician was immediately sent for; but the patient sank, and died in about two hours. The post-mortem examination, made for a coroner's inquest, showed that deceased "was a confirmed consumptive, both lungs being completely gone"—which strong language makes us wonder why he did not die sooner. The professional opinion, however, attributed the man's death to congestion of those non-existent lungs, accelerated by the inhalation of the gas; that if deceased had been in ordinary health, the accident would probably not have occurred; and that the condition of his lungs was such that the administration of the gas was highly imprudent. The jury "rendered a verdict" accordingly; exonerating the unhappy dentist from criminal intent, and adding one of those sapient recommendations in which Coroner's juries delight, that "an examination should be made by competent persons in all cases when it is contemplated to administer said gas."

38. *Military Hygiene.*—It is almost incredible that the state of things described in the following report could and did exist in the heart of the first city of the Union, in the third year of the war. Dr. Sayre, however, whom I have already mentioned more than once in these Notes, would be sufficient authority for more wonderful statements than these; and the accuracy of his description was attested by the Mayor, who visited the barracks in question subsequently to Dr. Sayre's inspection. No denial of the facts was attempted, with the exception that the assertion, contained in one of the concluding paragraphs, that the state of affairs had been brought to the notice of his superior officers by Dr. Blanvelt without effect, was said to be mistaken.

"To the Honorable C. Godfrey Gunther, Mayor and President of the Commissioners of Health,—

"DEAR SIR,

"In obedience to your request of this date I have visited the barracks in the Park, and present the following report:—

"The barracks on the Broadway side are 400 feet long by 30 wide, under the charge of Captain Hicks, who has three

assistants to keep it clean. This is used as a sort of boarding-house or hotel, for the various soldiers in their transit through the city to and from the seat of war. At the present time 800 men are accommodated there, independent of the Provost Guard, who occupy the lower portion of the barracks, and the number of which I could not ascertain. The building is not constructed with sufficient regard to ventilation in cold weather or means of warming; and as they have but three assistants, it is impossible to keep it clean, with 800 men tramping out and in with snow and mud upon their feet.

"It would require at least fifty men to do justice to the place; and in camp, under military discipline, it would take the whole 800, as each man would be compelled to police his own quarters, as should be done; but here they are simply boarders or guests in an hotel, to be waited on and cared for, instead of caring for themselves, and as the superintendent has no control over them, and as there is an entire absence of military discipline, some of the companies having no officers at all, as a matter of course, the building is much more dirty than it should be, but is kept as neatly as can be done, under the circumstances, with the amount of force employed; and unless the soldiers are compelled to police their quarters, the same as in camp, it will require, instead of three assistants, at least fifty, and these by constant labor, would not more than do the work in muddy and wet weather.

"Between these barracks and those on the Park-row side are arranged the water-closets, which were constructed for summer use only, and of course are entirely unsuited for this cold weather, and absolutely require an entire reconstruction, as they are now constantly frozen up.

"In the Park-row side a small room for the officer in charge and the medical attendant is cut off from the lower corner of the building, embracing one-half its width and opening into the barracks.

"Immediately behind this room a part is partitioned off, which the doctor very properly denominated the "pen." This pen is 15 feet wide, 20 feet long, 8 [?] feet high to the peak, and 8 feet to the eaves, boarded up on three sides tightly; the fourth, which faces into the barracks directly opposite an immense stove, which is heated to a

red heat, is separated by slats four inches wide, and placed three inches apart.

"In this fifteen feet by twenty there is not a bench, or stick of wood, or anything to sit on, not even a post to lean against, except the four perpendicular sides of the room. There is not even straw to cover the floor, as a hog or horse would have; but the accumulated filth of many months is the only thing that separates the inmates from the naked floor. In this pen are confined at the present time sixty-one men, and the officer in charge informed me that he had at one time as many as seventy-seven. Some of the men have been there from three to four months. They are thus imprisoned for various military offences, breach of discipline and desertion,—all huddled in this common pen, sick and well together. A guard is placed over them to prevent escape, and another guard is in waiting to accompany them to the water-closet in the Park, one at a time. The other seventy-six must wait their proper turns, no matter how pressing the necessity, from dysentery, diarrhœa or other cause; and of course the result of such barbarity can better be imagined than described.

"These men are fed through the bars, taking the meat and bread in their fingers, no knives or forks being allowed. Spoons are allowed once a day when they have soup. No blankets are allowed them, unless they happened to have one themselves when placed there; and but few of them are thus fortunate; they have therefore to lie upon the naked floor, with the exception of the accumulation of filth and mud before referred to.

"The doctor informed me that by laying them upon their sides in spoon fashion and by close packing, putting the heads of one row on the bodies of the row in front, he could pack forty-five in the pen. The rest are now taken out and chained to trees until these forty-five have had some sleep, and then they were transferred.

"The only mode of cleaning the apartment was by running in croton water from a hose through the slats, which forced the bones, pork-shins, potato-skins, &c., to the back and corners of the room, and, as it is nearly level, they remain there, and in some places are near an inch or two in depth.

"The men are covered with lice and vermin, and the stench was almost unbearable.

Dr. Blanvelt, who was in attendance, and who is a kind-hearted, honest, faithful man, informed me that he had repeatedly reported the nuisance as graphically as possible to his superior officers, General Canby and General Dix, and demanded redress; but up to the present time without any avail.

General Dix himself personally visited this place a few days since, and can, therefore, certify to the accuracy of my description.

This pest-hole is an outrage on humanity, a burning disgrace to any nation, and ought not for one moment to be tolerated.

If the general government choose thus to outrage humanity and treat their soldiers worse than wild beasts, in God's name, let them take them away from the city and put them on government property, and thus assume the responsibility for the outrage; but do not permit the city any longer to be disgraced by allowing them to occupy its grounds and on them practise such horrid barbarities.

Very respectfully, &c.

LEWIS A. SAYRE, M.D."

39. *Cerebro-spinal Meningitis.*—An epidemic of this disease broke out at Long Branch, (Long Island) while I was in New York, and Dr. Sayre was requested by the Mayor to visit the place affected, with Dr. Murphy, the Health Commissioner, and to examine into the character of the disease. Dr. Sayre subsequently made a report on the subject to the Academy of Medicine, but the following brief notes are taken from a newspaper account of the report sent in to the Mayor of New York.

At the date of the Commissioner's investigations, which continued for two nights and the intervening day, ninety cases had occurred, of which thirty-seven had terminated in death. The disease began with a rigor, and the "first stage" lasted about sixteen hours. During this stage many died. The second period lasted two to three days, after which convalescence may commence. The most alarming symptoms were congestion of the brain and paralysis; which, while persistent, render remedies ineffective. The disease was neither contagious nor infectious. It was not obviously dependent upon any special atmospheric conditions. There are no swamps or stagnant water in the neighbourhood of the

place where the epidemic existed. The soil is sandy, and the whole locality freely open to the sea-breeze. In fact, Long Branch is a fashionable bathing-place, and free from all suspicion of unfavorable sanitary conditions.

It was ascertained that the diet of many who had been seized by the disease had been unsatisfactory. Flour made from spoiled grain had been used as an article of domestic consumption; and as a substitute for coffee smutted rye had been consumed to a considerable extent. Again, it is the custom of many families to burn kerosene lamps all night, the wick being put down. This practice vitiates the air, and fills the sleeping rooms with impure gas. Every case of the disease, (and every case existing at the time of the Commissioners' visit was examined by them), could be traced to distinct causes,—the depression of the system by improper food, by breathing foul air, or by fear and moral influences of a dispiriting character. Exposure to cold or fatigue sufficed to bring on an attack in those thus predisposed.

40. *Extension by Adhesive Plaster.*—Dr. Gordon Buck, of New York, introduced the treatment of fractures by extension effected by means of adhesive plaster. So long ago as 1855, I saw this method applied, in the New York Hospital, to a case of fractured neck of the femur, under the care of Dr. Van Buren; who remarked to me that it was not easy to get improvements adopted at the eastern side of the Atlantic. This great addition to the curative methods of the surgeon has, certainly, made but little way. Seven years after I had seen the case in New York an article appeared in *The Lancet,* describing the means used in that city, with great success, for treating fractures of the neck of the femur, as well as other fractures. I doubt if any notice was taken of it. Nothing can be more simple than the apparatus for extension. A band of sticking-plaster (that made with canton flannel is the best for the purpose) is attached along the inner and outer side of the limb, forming a loop below the foot. A bandage is applied to the leg, over the plaster. A thin piece of wood is laid in the loop, to which a cord is fastened. This cord passes over a pulley at the foot of the bed, and bears a sand-bag or other weight, variable according to circumstances. The plaster rarely causes any irritation of the skin, none of any consequence, ever.

Another most valuable application of this method has been made, conspicuously by Dr. Sayre; namely, to the treatment of diseased joints; especially those of the hip and knee. In the ulcerative stage of disease extension made in the manner above described not only gives perfect and immediate relief from pain—due to the apposition and friction of the affected cartilages—but affords opportunity for the complete restoration of the diseased surfaces. Some of the cures which came to my knowledge, effected in this way, were wonderful. Again, the result of the application of this method to older cases is not less gratifying. Two of these, under the care of Dr. Sayre, I was fortunate enough to see. In one, a young woman of 23, extreme flexion of the thighs had existed for 17 years, rendering the patient completely a cripple. The muscles of the thighs were divided, and by means of weights subsequently applied, the limbs were restored to their natural position. At the time of my visit the condition of the patient had been improved to an extraordinary degree; and I could not doubt that she would ultimately recover entirely the use of her limbs. In the second case extreme flexion of the leg upon the thigh was treated by extension only. The child still wore a simple apparatus, keeping the joint extended; but was able to run and play about, without pain or any appearance of lameness.

41. *Artificial Hip-joint.*—In a paper read before the New York Medical Society in 1863, and afterwards printed as a pamphlet, Dr. Sayre published two cases in which he had performed "a new operation for artificial hip-joint in bony anchylosis." I hope the following very much condensed abstract of these cases may prove interesting.

R. Anderson, aged 26, was admitted into Bellevue Hospital in May, 1862. During the summer of 1849, (being then 14,) accustomed to bathe every evening in a river, on one occasion, after severe exercise in running and jumping, he remained in the water for several hours. About the middle of September he felt a dull pain in the right hip, so gradually developed that no definite time could be assigned for its commencement. For a week he continued to attend school and to play as usual; until one day, after having taken more exercise than usual, he was attacked by fever. Next day stupor supervened, and lasted, with intervals, for nearly three weeks. He was capable of being aroused, but

was indifferent to everything which happened around him, unless when so stimulated. Intense sharp and lancinating pain was felt in the right hip, which was hot, red, and greatly swollen. The tumefaction extended half-way to the knee. After a month this swelling had subsided considerably; pain was much less, though still very severe when the joint was moved. No pain was at this time felt at the knee.

Then commenced pain in hip and knee of left side; dull, never lancinating as at the other side. This continued for two months.

Ten days after the beginning of the disease, pillows were placed under the patient's knees to relieve the pain. These were subsequently increased in thickness, and their use continued for the six months that he remained in bed. During the next six months, he occasionally sat up in a chair; but while in bed the pillows were constantly applied. The consequence of this treatment was that the legs were flexed upon the thighs, the thighs upon the pelvis, and so remained. During these twelve months occasional pain was felt in both hips, more severely in the right.

At the end of two years from the date of the attack, an abscess formed in the left groin, which discharged for two years. Others formed about the right hip—one beneath the gluteal muscles, one near the anus—and continued open for about eighteen months, discharging freely. For six or eight years previous to admission his general health had been perfectly good. His condition on admission is thus described. "The left thigh was immovably fixed at nearly a right angle with the pelvis, by bony cementation of true anchylosis. The right was very firmly attached at an angle not quite so acute, and by a very careful examination I thought some slight motion could be detected which indicated that the attachments were fibrous in character, or at most were osteophytes only, and external to the joint, and that there was no agglutination between the femoral head and the acetabulum, whereas the opposite side seemed perfectly cemented together. He could not walk, except by whirling himself in semi-circles, first on one leg as a pivot, and then the other—or else by swinging himself on his crutches from the axilla. In order to get both feet upon the ground at the same time, his back was curved inwards very much at the sacro-lumbar junction, the left knee flexed

at an angle of about 45 degrees with the thigh, and the right side of the pelvis was some inches higher than the left. He could only sit by assuming a most awkward posture, half reclining on his side upon a couch or sofa; and in lying down, was curled up either on one side or the other, or if upon his back, he had to be supported by pillows under his knees, and under the lumbar vertebræ. In fact, he was the most pitiable object I ever saw, and one that would excite the sympathy of any surgeon."

On the 4th May, 1862, Dr. Sayre divided subcutaneously the adductors, rectus, tensor vaginæ femoris, and femoral fascia on the right side, broke up the adhesions by the exertion of considerable force, and obtained good motion of the joint. Extension was made by weight and pulley, and the hip enveloped in wet cloths. No serious trouble followed the operation, and in six weeks, he could flex, extend, abduct and adduct the right limb, with considerable freedom.

A different procedure was adopted for the relief of the deformity of the left hip. Dr. Barton of Philadelphia had been the first to operate in a case of this kind, by making a V section in the shaft of the femur, and thus bringing the limb down parallel to the other, and obtaining anchylosis in an improved position. This operation was subsequently performed by Dr. J. K. Rodgers of New York, with equally good results, differing, however, from his predecessor by making the section somewhat higher up in the shaft. The procedure adopted by Dr. Sayre in Anderson's case was essentially different in its object; which was, not fresh anchylosis, but the formation of a new joint. His section was made above the trochanter minor, so as to retain the insertion of the psoas magnus and iliacus internus attached to the lower part of the bone for the purpose of flexion; the form of the section was also different, being semi-circular, with the concavity downward. By cutting out a semi-circular piece and rounding off the end of the lower section, he expected to imitate more nearly the natural joint, and give the patient a better chance of motion at that point, with less danger of the parts slipping by each other when he walked, than if the exsected portion were cylindrical or wedge-shaped. It is unnecessary to give the details of the operation which was performed on the 11th June 1862. The limb was subjected to moderate traction longitudinal

and lateral, the edges of the wound drawn together by straps of adhesive plaster, and cold-water dressing applied.

The patient did well after the operation. Considerable pain was felt occasionally, relieved by modifying the degree of traction. On the 1st September all extension had been removed and the man sat up. His general condition was very good, and he had gained very much in flesh since admission. On the 12th October he was able to walk round the hospital on crutches, which had to be lengthened seven inches, as he had become quite straight since the operation, except for the lateral curvature of the lower lumbar vertebræ, which raised one side of the pelvis and made the right leg apparently shorter than the left, from which the segment of bone had been removed. He could sit down and rise up with the help of his crutches only. He left the hospital in good health and with very good motion in both hip joints. About three weeks afterwards he was attacked with acute pain in the site of the wound, which became inflamed and suppurated. In a few days a small semi-circular piece of bone came away, and four days later another similar fragment—the two together forming almost a ring, and being apparently exfoliations from the lower section. The pain then ceased and the wound healed rapidly.

Late in December he left for his native State, Kentucky. He could then "go up or down steps without difficulty; could stand on either leg without crutch or cane; could take a step with either foot 27 inches, and when he supported his body on his crutches, could abduct his legs so that his heels were 36 inches apart. He could cross either leg over the other below the knee, without assistance, but could not cross them upon the thigh." On April 11th, 1863, (just ten months after the operation) he writes: "I can now 'rough it' a little without apprehension of having to suffer for it afterwards. I can bear my whole weight on my left leg without inconvenience, and can walk very well without other assistance than a walking-stick, and the improvement is as great in a month now, as at any previous time."

This concludes the case in Dr. Sayre's pamphlet, and I am sorry that by a strange coincidence, I have to add an appendix. On the 23rd March, 1864, I received from Dr. Sayre a copy of the tract before me; and while I was in his office, Anderson himself came in unexpected by any one—and

alas! *on crutches*. He had been again attacked in the country with inflammation in the left hip, had been injudiciously treated, and now presented firm anchylosis of the left hip-joint. No doubt this result was a source of deep disappointment to both patient and surgeon; but it does not materially detract from the value of the operation, on account of which I notice the case. Irrespectively of the operation for false joint the treatment was eminently successful, though to appreciate fully its success would require the opportunity of comparing the ultimate condition of the man with the miserable state in which he passed about ten years of his life. Such opportunity I enjoyed through accurate drawings of the patient made at the time of his admission into Bellevue Hospital.

The second case recorded in Dr. Sayres' pamphlet was, though the patient died, (from a cause unconnected with the operation or the disease), decidedly successful. I was fortunate enough to see the preparation of the parts concerned.

Susan Losee, aged 24, of vigorous constitution, was attacked by pneumonia in March, 1856. After three weeks she went down stairs, (contrary to medical advice); and on the following day suffered intense pain in left hip and thigh, which lasted without intermission and with great severity for several months. She was not conscious of having sustained any injury, but it was supposed that being very weak, and going down stairs without assistance, she had in some way wrenched the joint. During the first few weeks her limb remained extended, and could not be flexed, abducted or adducted without intense suffering. Bed sores had now formed to such an extent that it was absolutely necessary to change her position. In effecting this the limb was forcibly flexed at hip and knee, at the cost of dreadful suffering: rather than repeat which by re-extending, the extremity was left in its new position. New sloughs appearing over the right trochanter, she was placed in a large chair, in which she was left for two months, until sloughing occurred over the tuber ischii, and at the extremity of the coccyx. She was thus compelled to resume the horizontal posture; and having to lie on the right side, the left thigh was thrown over the right, in a flexed position; and became perfectly anchylosed, thus, in seven months from the commencement of the disease. No local application had been made to the hip, nor any extension employed to obviate

muscular contraction and consequent deformity. Pain was combated by narcotics, principally morphia. When she recovered (if the word can be used) " her left thigh was permanently flexed, at about 40 degrees with the pelvis, and adducted across the lower third of the right thigh. In the erect posture, the heel of the left foot was 10½ inches from the floor, and to the right side of the right leg. In attempting to walk, it was brought to the floor, still on the right side of the opposite limb, or cross-legged; and was made to reach the floor by a remarkable curvature forward of the lumbar portion of the spinal column: but walking was attended with great fatigue, and a peculiar dull pain in the lumbar region." The urine produced constant excoriation of the limbs, and it was found impossible, though persevering attempts were made, to introduce a catheter.

In this miserable condition the girl remained for seven years. In 1861, she placed herself under the care of Dr. Taylor who practises the so-called "Swedish-movement" cure with success. He believed the anchylosis to be fibrous merely, and curable by "passive motion;" but he failed to effect any improvement in the patient's condition, his diagnosis of the nature of the case being mistaken. She then came under Dr. Sayre, who in April, 1862, made a subcutaneous division of the muscles concerned. The operation was followed by no inconvenience, but also by no advantage whatever; and it was determined to remove a piece of bone, as in Anderson's case, with a view to the formation of an artificial joint.

On the 6th November, 1862, the operation was performed, almost as in the former case. The exsected semi-circle of bone measured one-eighth of an inch at the front or internal margin, three-fourths at its middle, and nearly half an inch at its external margin. It was very dense in texture. About two ounces of blood were lost, and no ligature was required. Adhesive plaster was attached below the knee for the purpose of making extension, and a bandage applied firmly from the toes up, pelvis included. The foot of the bed was raised twelve inches higher than the head, and extension made by a weight in the usual way. Lateral traction, (to keep the upper end of the femur from pressing on the femoral vessels,) was applied by means of a broad band passed round the thigh and a cord attached to its outer aspect, to which a weight was appended. By these

means the limb was brought to be parallel to the other and apparently of equal length.

I must omit details of progress. On the 1st March, four months after the operation the wound was perfectly healed and closed—two small pieces of bone having escaped; the limbs were parallel and symmetrical, except that the left was nearly three-quarters of an inch shorter than the right, when her weight was rested upon it; "but when she stands erect on the other leg, it falls down, and is nearly, if not quite as long as its fellow." By upward pressure it could be shortened half an inch. Concussion gave a smooth sensation to the hands, without crepitus, or pain to the patient. She began to have control over the movements of the limb, and could bear nearly her whole weight upon it. The operation had unquestionably succeeded in its object.

It is unnecessary to trace the patient's downward progress, partly the 'result of her own imprudence,' partly due to excessive doses of codeia administered by a careless nurse. She died exhausted by narcotism following pneumonia, on the 17th May. The post-mortem examination showed not only that death was altogether unconnected with the original joint-disease and subsequent operation performed for its relief. It afforded, moreover, a most remarkable instance of what, for want of a better name, we call the reparative power of nature.

The artificial joint was found to be provided with a complete capsular ligament. The articulating surfaces were tipped with cartilage and furnished with synovial membrane. The conjunction of the surfaces was perfected by the formation of two round ligaments, springing from the new acetabulum, which, converging to one point of attachment on the head of the femur, constituted a new ligamentum teres. The whole of the old joint was united in one solid bony mass.

Dr. Sayre's paper concludes with an account and figures of an un-united ulna. He exsected the false joint, seventeen months after the fracture had occurred, and it was found to present all the characters of a natural articulation.

42. *Swedish Movement-Cure.*—Dr. Taylor, whom I had occasion to mention in last Note, has been very successful in the application of this remedy to the restoration of paralysed muscles. Combining a regular medical education

with great mechanical ingenuity, he has rescued a powerful therapeutical agent from the exclusive possession of charlatans, in whose hands, so far as I am aware, it is still left by our brethren in England. His rooms in Fifth Avenue contain a number of machines, invented or improved by himself, and intended for the gentle and gradually increasing exercise of muscles which have lost their power partially or wholly. These instruments are varied in form to suit the various parts requiring their aid; and the metal weight which produces the resistance to be overcome, can be altered in position, and so in power, in order to accommodate it to each particular case. I saw one of these machines in action upon a little hemiplegic girl whose digestion was torpid. A pad fixed upon the abdomen received, by means of a wheel, a rapid motion from side to side, thus "kneading" the viscera. To this practice Dr. Taylor attributed great success in the treatment of dyspepsia—the operation being continued for a quarter of an hour, once or twice a day. To see this process going on is apt to provoke mirth, but I believe it is a useful one.

The only cases which Dr. Taylor considers himself unable to benefit are the syphilitic—when the paralysis depends upon venereal inflammation and thickening of the membranes of the chord. Paralysis following apoplexy or injury, that dependent on uterine disease, or semi-imaginary hysterical cases, invariably derive advantage from the treatment; and patients are continually recommended to seek Dr. Taylor's aid by the leading practitioners of New York. The use of internal remedies is not excluded, but he attaches little importance to them except as palliatives. His practice lying almost altogether amongst the wealthier classes, he has never had an opportunity of applying his special treatment to a case of lead-paralysis. The experiment would be both interesting and valuable.

43. *Typhus.*—Dr. Emmett, now well-known as the successor of Dr. Sims in the Woman's Hospital, and his rival in the surgical treatment of vesico-vaginal and kindred fistulæ, was, in the early part of his professional career, the first (and organizing) physician of the Emigrant's Hospital. Here he remained for several years, seeing about 13,000 cases of typhus, of which a large proportion were "ship-fever." He would seem to have been very successful in his treatment, the deaths being reduced to 4 *per cent.*

He depended mainly upon stimulants, guided by the state of the heart; but he attached much importance to the practice of shifting the patient's position—from side to side or back—every twenty or thirty minutes, night and day. By this means hypostatic pneumonia was avoided.

Dr. Emmett recognises no essential distinction between typhus and typhoid. He observed that of persons exposed to the same miasmatic cause of "ship-fever," the German immigrants, almost without exception, exhibited abdominal complication, (or typhoid;) the British and Irish, cerebral.

On one occasion the State Legislature heard of his "barbarity" in having a large number of sick in sheds, not very well protected from the weather—where, however, the death-rate was little over 4 *per cent.* A committee investigated and ordered the removal of the sick to a "comfortable brick building." This was effected; and the mortality rose to nearly 60 *per cent.* Similar facts were observed in Ireland in 1847 and following years.

44. *Radical cure of Procidentia Uteri.*—Dr. Emmett's operation is a modification of Sims', which is itself a modification of Marshal Hall's. I had only once an opportunity of witnessing its performance; and I fear I shall not be able to describe the operation intelligibly without a figure. On the posterior wall of the vagina *a triangle* is scarified (not a triangular space but a triangle in outline) having its base transverse and below the cervix, its apex pointing towards the outlet. The sutures are passed beneath the raw sides of the triangle, over the intermediate un-scarified part. These when drawn up bring into contact the two halves of the base of the triangle, and the two sides along their entire length. The raw surfaces coalesce, and also probably the intervening unscarified parts.* If all the sutures hold, the cure is complete and satisfactory, and I saw one woman on whom this operation had been performed, who had subsequently borne a child without disturbance of the stability of the adhesions. In her case, the perinæum had been absorbed, in consequence of the constant pressure of the protruded uterus, (which, I may add, though completely external to the vulva, contained when she was first seen a fœtus of two months.) On the other hand, one or more

* I saw one case in which a urethra had become permanently closed through disuse alone—thus proving that mucous membranes will become adherent sometimes.

of the sutures may cut out, and the cure may then be incomplete or lack permanence; as occurred, indeed, in this very case which I saw about two months afterwards. Two sutures had cut out; and, in consequence, there was a prolapse of the tissue which ought to have been doubled up behind the line of union. The upper band held fast, and kept the uterus in position; but there was a probability the prolapsed mucous membrane would increase in amount, and render a second operation necessary to get rid of it.

The operation lasted two hours, and seventeen silver-wire sutures were inserted. Ether was not used, the patient consenting to bear the pain. The vomiting which sometimes follows etherization may cause sutures to give way. The patient bore the tedious operation with wonderful fortitude.

45. *Lithotomy through the Rectum.*—I am not sure that the profession in this country ever heard of this operation. Dr. Emmett, however, told me that he had no doubt not only of its superiority to the ordinary operations for the removal of stones from the bladder, but also of its ultimate adoption universally. Of course he would naturally have a leaning to a procedure to which the use of Sims' speculum and the skilful insertion of silver sutures are essential; but his opinion is supported by the extraordinary success of this method in the solitary case in which it had been tried in New York. The operator, Dr. Bauer, had first ascertained by many careful dissections that, in all cases, *at least* one inch of the anterior aspect of the rectum is uncovered by peritonæum, and that this free space not unfrequently extends to one inch and a half.* Having secured Dr. Sims' valuable assistance for the insertion of the sutures after the removal of the stone, Dr. Bauer extracted it through an incision made through the rectum at the part indicated, and the case recovered perfectly. It is important to add that the subject was an old man, of broken constitution, and in condition so unfavorable for sustaining an operation for lithotomy, (his pulse being 120 when he was placed upon the table), that Dr. Sims disapproved of its being attempted. The experimentalist, however, had brought together

* In cases of retention of urine requiring puncture of the bladder, English, American and French Surgeons, almost universally, I believe, prefer operating through the rectum. In Vienna, on the contrary, the puncture is made above the pubes.

a number of professional compatriots, (Germans) to witness his skill, and could not be induced to postpone the operation. The experiment was made, in spite of adverse circumstances, and the issue fully justified Dr. Bauer's determination.

46. *Enormous Calculus.*—The venerable Dr. Mott, the greatest and best-known of American Surgeons (who died in April, 1865) told me that he had extracted the largest stone which he had ever seen or heard of as removed from the living human bladder. It weighs sixteen ounces with penny-weights and grains, bringing the weight nearly up to seventeen ounces. He removed it with forceps resembling the obstetrical instrument—each blade being inserted separately.

47. *Silver Suture.*—Dr. Marion Sims' invention of the silver suture has already been the means of relieving hundreds of women from loathsome and previcusly incurable infirmities. It is much to be regretted that this improvement is making so little way in general surgery. The following cases, to which many might be added, show what advantages may be obtained from the use of silver wire, instead of silk ligature, in other operations than those undertaken for the radical cure of vesico-vaginal fistulæ, &c.

Dr. Emmett once removed a cancerous breast, of such dimensions that the external wound measured nineteen inches in length. Eleven arteries were tied *with silver wire.* The external wound was closed with one wire, in whip-stitch. The woman was up in one week after the operation. Four months afterwards the external wire was removed, because it interfered slightly with her employment as a laundress. It was causing, and had caused, no irritation whatever. The parts had healed by first intention months before. The wire ligatures remained inside, and produced no irritation either. The woman having died, fourteen months after the operation, they were found encysted and harmless.

A Washington Surgeon, visiting the New York Woman's Hospital took away some of the silver wire used in that institution. Shortly after his return southwards, a citizen and a congress-man had a "difficulty" in a street or barroom, and one (I forget which) drew a bowie-knife across his adversaries abdomen, giving free vent to his intestines.

Operation for Cataract, anterior, of Saunders...		5	„
„ „ popliteal aneurism	..	20	„
„ „ carotid „	...	40	„
„ „ inguinal or external iliac.		40	„
„ „ brachial ... „		10	„
„ „ radial, tibial or ulnar „		5	„
Lithotomy	...	30	„
Bronchotomy	..	5	„
Trepanning	...	20	„
Circumcision	...	2	„
Common case of midwifery	from 5 to	7	„
Tedious or difficult case	„ 7 to	12	„
Case of gonorrhœa	„ 3 to	6	„
„ syphilis	„ 5 to	20	„
Preparing and administering enema	...	8	shillings
Visit on board of vessel at wharf	...	10	„
„ „ „ in stream	...	1	pound.
For an opinion involving a question of law, and in which a physician may be subpœnaed	...	1	„
Extracting a tooth at patient's house	...	8	shillings.
„ „ surgeon's „	...	4	„

ART. X.—*Extracts from the Annual Medical Report of European and Native Troops at Secunderabad.* By Deputy Inspector-General of Hospitals E. BALFOUR, Esq.,

Communicated by the Principal Inspector General, Medical Department.

THE Grand Trigonometrical Survey of India determined Secunderabad to be in Latitude 17° 20·7′ north; Longitude 78° 28′ east; and 1830 feet above the level of the sea. It is the largest Military Station in Southern India, the largest perhaps in any part of India, and is composed of the following arms and strengths:—

1 Regiment European Cavalry.
1 do Native do
2 Regiments European Infantry.
1 Battery Royal Horse Artillery.
2 Batteries Royal Artillery.
1 Field Battery do.
3 Regiments Native Infantry.
2 Companies of Sappers.
Ordnance and Commissariat Public followers.

This force is the Subsidy which the British Government, under the Treaty of 1801, furnishes to the Nizam of the Dekban as a part of the Military Establishment of the Hyderabad Territories; the Ceded Districts, now forming the Collectorates of Cuddapah and Bellary, having been ceded under the same treaty to the British Government, to provide the pay of this force. On the other hand the Nizam furnishes a Military Contingent, composed of—

4 Regiments of Native Cavalry.
6 do do Infantry.
4 Light Horse-field Batteries of Artillery,

which are spread over the Hyderabad country.

* * *

From 1801 until recently, the bulk of the Hyderabad Subsidiary Force were lodged in barracks and huts in a line about three miles long, extending from the villages of

Russulpur and Begampet on the west, to the second milestone on the old Madras Road. * * But in the past seven years the European troops have been gradually occupying ground more to the north easterly from the hamlet of Trimulgherry. Already two regiments of Infantry and two Batteries of Artillery are there, and the remaining Europeans, viz., a corps of Cavalry and two Batteries of Artillery will be moved to the north as fast as accommodation can be provided. It is, however, not probable that all the changes will be completed within the next decade. The whole cantonment is, therefore, in a state of transition. * * At present the sites, on which both the European and Native troops are placed, are wide apart. The Horse Artillery on the extreme south-west are about five miles from Eman Zamin Hill, near which two Batteries of Artillery are placed, and about three miles from the European Cavalry on the right flank.

Merely to describe it, therefore, as in Latitude 17° 20′ north, and in Longitude 78° 25′ east, would give no idea as to the character of a Cantonment which is spread over about nineteen square miles.

* * *

Movement of Troops.—The position of Secunderabad is almost in the centre of the peninsula, being 221.3 miles from the sea coast at Masulipatam on the east, and from Vingorla on the west about 350 miles. In a military or sanitary point of view this is of importance only in connection with the facilities for moving troops or removing the sick. Until the last few years the sick and invalids at the close of the year were moved by day's journeys under canvas, 400 miles, to Madras, and for troops in health marching in tents was the only mode of moving. About 1857, however, transit in sick carts began to be adopted, and the route via Masulipatam and by sailing or steam ship to Madras was then chiefly followed. Within the past few years railroads have been opened from Bombay to Sholapoor, 197 miles from this, from Madras to Cuddapah 256½ miles, and from Madras to Bangalore 201 miles, changes which have already greatly modified the routes selected in journeys to and from this place. The north-west line of Railway from Madras to Bombay is in rapid progress between Cuddapah and Sholapoor; that from Madras will be opened on 1st August 1866, to Moodanoor, 291½ miles from Madras, and as a branch will doubtless

ultimately join this place, the existing routes will be still further modified.

Secunderabad to	Miles.
Sholapoor	197·
Kurnool	133·3
Cuddapah via Kurnool	256·5
„ „ Gooty	292·7
Bellary	229·7
Bangalore	292·7

There is, however, no immediate prospect of a branch line to this place, and at present the nearest point of any railway from this will be Raichore in the Kistna and Tumbudra Doab, about 137 miles from here. Kurnool, 133 miles, is about the same distance, but the nearest station to Kurnool will be Ampree, 50 miles, and the next nearest Ghooty 56 miles off, so that the journey via Kurnool to the rail will be 183 or 189 miles, against 130 via Raichore. And it is very advisable that preparations be commenced for traffic through Raichore. At present, as the bullocks on the line are the best trained in the south of India, the favorite route to the south, alike for troops and sick people, is via Kurnool, Bellary and Bangalore, from which the railroad becomes available to the Sea Coast, to Bangalore, to the Shevaroy or Neilgherry Hills.

Buildings.—Under the orders of G.O.C.C. No. 83 of 9th May 1865, heads of departments are required to send in, for the examination of a Committee, a list of all buildings required to complete the accommodation of their respective regiments and departments. It was necessary before making any recommendations on such a subject to ascertain what buildings were already in progress and what sanctioned. The following are three lists of works in progress; works sanctioned; and works needed; and these more than any description will explain the vast extent of accommodation still needed to lodge properly even the two regiments of Infantry and two Batteries now at North and South Trimulgherry.

List of Military Buildings actually in progress.

A. Conservancy.

Blasting and removing Rocks.

B. Sanitary.

Granite flooring to Public Buildings.

Water-supply 1st Regiment European Infantry.
Building separate Washing rooms for European Infantry.
Erecting privies for Half Company Barracks, 2nd Regiment European Infantry.
Sinking a well for a Battery of Artillery at Trimulgherry.
Erecting wash houses for Half Company Barracks, 2nd Regiment European Infantry.
Erecting Cook-rooms for do. do.
Building aqueduct, &c., for raising water-supply for do.
Separate Bath-rooms, Family Quarters 2nd Regiment.

C. Accommodation.

Erecting Family Quarters for Royal Artillery.
Adding cells to Prison accommodation.
Applying perforated zinc to all the field Barracks.
Erecting Half Company Barracks, 2nd Regiment European Infantry.
Numbering Public Buildings of 1st Regiment European Infantry and of Artillery.
Erecting out-houses to Family Quarters, Royal Artillery.
Erecting double storied Half Company Barracks of Artillery; out-houses to do.

D. Amusement.

Erecting Fives Court for Artillery.
Do. 2nd Regiment European Infantry.

E. Religion.

Erecting Roman Catholic Church.

List of proposed or sanctioned Public Buildings for 1866-67.

Water-supply for 2nd Regiment and General Hospital.
Out-houses to Barracks, 2nd Regt. European Infantry.
Serjeant Major's Quarters do.
Staff Serjeants, second class, A. and B. do.
Horse Hospital for Royal Artillery.
Major's Quarters do.
Captain's do do.
Additions to Captain's Quarters, 1st Regiment European Infantry.
Female Hospital for two European Regiments.
Alterations and improvements to Arsenal.

I now subjoin the *List of Buildings, which I consider to be needed for the military of this station,* and which I have recommended.

Royal Artillery.

No. 1.—Hospital needed for the sick of 12 per cent. of 520 men, viz., 62·40 sick = 6,240 superficial feet.

„ 2.—A small native hospital for the native public followers, as per Governor-General's orders.

„ 3.—A women's hospital or maternity for.

European Infantry.

„ 4.—A women's hospital or maternity for.
Houses for the hospital servants.

„ 5.—Houses for the two Native Dressers.

„ 6.—Adjoining or inside cook-room; a small room 6 × 10 × 8 with door and padlock, to lock up the cooking utensils at night.

„ 7.—A new guard-room to the north.

„ 8.—Shed for four sick Carts and four dhoolies.

„ 9.—Apothecaries' quarters. Enlargement under reference.

„ 10.—1st European Infantry Medical Officers' quarters.

Maternity or Women's Hospital now in the most northerly block of the South Trimulgherry Barracks.

„ 11.—A small temporary cook-room. } For the nurse.
„ 12.—And latrine. }

„ 13.—A small temporary latrine for the women and children.

For the Cantonment Civil Population.

„ 14.—Near the centre, a dead house, pent-roofed, eaves and ridge ventilation, door and windows: 10 × 10 × 12, with one door and screen, and three windows.

Hospitals of 4th, 29th and 38th Regiments M. N. I.; of Cantonment; and of 2nd Regiment M. Lt. Cavalry.

„ 15.—One building each, 9 × 9 × 12;
„ 16.—Door;
„ 17.—Three windows;
„ 18.—Pent-roofed with eaves and ridge ventilation; suited for a dead-room for each hospital.

Hussar's Hospital.

„ 19.—A small native hospital for the native public followers, as per Governor-General's orders.

Married Quarters, Hussars, 1st European Infantry, 2nd European Infantry, and Artillery.

No. 20.—Erection of punkahs.

The whole of the surrounding country is treeless. There are patches of trees—tamarind, palmyra, date and custard-apple, near villages—but the country is bare. The Assistant Quarter-Master General is busy planting along the road-sides, and a year or two will do wonders to shade the walks with trees, but the want of trees generally leaves the appearance, during the hot weather, of great aridity. Of fruits, which Europeans esteem, the plantain is obtainable, and custard-apple is in such abundance that, in their season, 100 can be had for a shilling, but all the finer fruits are dear. There are but few wild game.

Lock Hospital.—As a matter intimately connected with the health of the troops, it may be mentioned that there is a Lock-Hospital at the station. It is situated in a building in the bazaar adjoining the barracks of the European Cavalry, which was formerly occupied as the Cantonment Hospital. It is capable of holding fifty immates, and the marginal note will show its past operations. It would be useful to show the venereal admissions from amongst the troops, but as in this class of ailments are included several of an old or secondary character, the advantages of contrasting these with the Lock admissions are not apparent. * * * In the sixteen years from 1842 to 1858, out of an average strength of 1283 European Troops, 6711 were admitted from venereal affections, amongst whom nine deaths occurred.

Year.	Admitted.	Died.	Average daily Sick.
1860	483	...	$20\frac{3}{4}$
1	464	1	$36\frac{3}{4}$
2	596	...	$42\frac{1}{4}$
3	603	...	$46\frac{3}{4}$
4	384	4	$34\frac{1}{4}$
5	426	2	32

The transition state of the barrack accommodation has left this institution quite in the south-east corner of the Cantonment. On my arrival, part of the common women, about sixty of them, were residing in the bazaar at North Trimulgherry, and those residing in the Cantonment, about seventy in number, were scattered amongst the general community.

Those in the Trimulgherry bazaar have now been restricted to one street; their houses have all been numbered, and the register indicates the women both by name and

number. The Cantonment women have now been brought into the old Lal bazaar adjoining the barracks of the European Cavalry. Previous to this segregation, some women resided in places where arrack was sold, and their present separation from the general community inhabitants, will distinguish the objects of visit.

The admissions in 1865 from this class of ailments have been as follows :—

H. M.'s King's Dragoon Guards......	37
„ 18th Royal Irish...............	114
B/D Brigade Royal Horse Artillery.	21
B/23d „ Royal Artillery.........	42
B/14th „ „	21
D/23d „ „	32
No. 5/20th Brigade „	12
H. M.'s 105th Regiment..............	133

To ensure due control over the women, who ply their avocation clandestinely, some of whom resorted to the rocks adjoining the barracks, the police, at my request, have prevented their loitering about at dusk. The Artillery have had fewer cases of this disease than the Infantry. The higher morale of the Artillery body, and their greater self-control may have partly effected this, but in the B/D Brigade and the B/23d Brigade, whenever a gunner fell sick, the woman was pointed out and sent to hospital. The mounted corps also (but of this there are doubts) may visit a better class.

An examination room has been fitted up in North Trimulgherry, to which those residing there come weekly; and the sick amongst them are sent to the hospital. Those in the Cantonment bazaar attend the hospital itself weekly. With the Troops all moving several miles to the north, the early removal of the Lock-Hospital to the same neighbourhood seems inevitable, though it would as yet be perhaps premature.

Rations.—There has not been any alteration in the rations during the year, the order of Government, 878 of 1853, being still in force. Of the diet articles, the mutton and beef were generally good, the sugar of inferior quality, the bread ill-baked, and the vegetables deficient in variety. All these are supplied by contractors, but the bread contract seems the most difficult to control owing to the annual changes. There is no public bakery, and as each contractor has to make his

own arrangements, the difficulty of obtaining a suitable house and the expense of its adaptation are considerable.

Bakery.—The contract system is undoubtedly the best and safest, for all occasions, but a bakery building of a suitable size and form should be erected by Government, or by private enterprise, and the contractor for the time compelled to occupy it. Neither the 1865-6 nor the 1866-7 contractors, in the buildings they occupy have had sufficient space for their grain-grinders, and a considerable portion of it has been ground by sub-contractors in the bazaar, where there can be no supervision. The 1865-6 bakery was not cleanly kept. In 1864, writing from Bellary, I recommended that Government should erect a bakery and couple its rental with the contract. The Commissary General replied that it was intended to erect bakeries with machinery: but, even if this be done, the building which I advocated could be built in anticipation, and so constructed as to admit of the subsequent introduction of all needed machines.

* * *

Vegetables.—The ailments of this station which prove fatal to Europeans are dysentery and liver disease, and a plentiful supply of good fresh vegetables is therefore of much importance to their health. It would be easy for contractors or Government to keep on hand a supply of preserved vegetables to meet any temporary deficiency, but the value of freshness in this class of dietary articles would out-weigh all considerations as to quantity, and it is to their cultivation that attention should be directed.

[Here follows a list of nearly fifty vegetables which might easily be grown at Secunderabad].

Assistant Surgeon Simon, M.D., writing on this point, mentions that " vegetables are scarce at certain times in the year. So much so that there is often difficulty in procuring them, and even when obtained, they are frequently so stringy and fibrous, that the men do not care to eat them. The more common vegetables, however, such as onions, pumpkins, carrots, radishes, and a kind of spinach, can generally be found."

The vegetable issues have consisted of carrots, radishes, pumpkins, ochro, and egg plant. In 1865, for a short time the supply of potatoes failed to be received from Poonah and Bangalore, and ¼ a lb of bread was issued in lieu of them.

(In Ireland when potatoes are in use the usual allowance is 3¼ lb per head thrice a day.)*

Assistant Surgeon Ramsbotham, M.D., Royal Artillery, however, though he "thinks the supply of vegetables has been sufficient," adds that "the men frequently supplement them with fruits in season." He says "carrots, onions, turnips, radishes, lettuce, cabbage, brussels-sprouts, beans, peas, banday-koy, bringhall, nolecole, capsicum, sweet-potatoes, cucumber, and pumpkins, will all grow well. I think that in such a climate as obtains in Secunderabad, where most European vegetables will grow well with ordinary care and plentiful water supply, a regular methodized system of vegetable cultivation should be introduced, and vegetables be specially cultivated for the supply of the troops; from what I have seen of private kitchen gardens in the station, an excellent supply of good vegetables might be obtained for all the troops throughout the year; even potatoes, I think, might be successfully cultivated; at all events, the Provost Sergeant has proved that this may be done in the ground around the Trimulgherry Military Prison. If instead of permitting so much rice cultivation within the cantonment proper, such fields were cultivated with vegetables, both the amount of malaria would be diminished, and an excellent supply of vegetables obtained.† Fruit is rather scarce, the principal, grapes, custard-apple, mango, plantains and melons."

General health.—Many of the soldiers whom I have seen when inspecting here and in other stations, in the past four years, have appeared to me to be considerably under-fed: to be, if a common expression were written, under par. I have seen them when inspecting at some of the principal stations, Rangoon, Thayet-myoo in Burmah, Penang and Singapore in the Straits, Bangalore in Mysore, Bellary in the Ceded

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* Eaten with buttermilk and salt *only*.—ED. *M. Q. J.*

† We should have thought that this matter was almost entirely in the hands of Commanding Officers, and would be met by the immediate establishment of Soldiers' gardens. That Soldiers' gardens may be made a success, not only furnishing the men with good, fresh, wholesome vegetables, but allowing of the cultivators gaining the further advantage of selling a portion of their produce, has been proved even in so unpromising a situation as the berms of Fort St. George. We have been present at a kind of fête in these really pretty gardens when a large sum of money was distributed in prizes to those men of the 76th Foot, who had been most assiduous and successful in their gardens. The matter may also be viewed in another light, viz., as affording a healthful employment to the ennuyé soldier.—ED. *M. Q. J.*

Districts, and here, and I have no doubt that the bulk of them were more or less short of robust health. The causes have seemed to be various. That recruits have a lower physique than formerly might be at once assumed from the fact that latterly recruiting for the army has been becoming more difficult. The last party whom I saw arrive was for H. M.'s 108th Regiment, and on the 18th December appeared youthful, slender and anæmic. Assistant Surgeon Clery, the medical officer of this corps, when alluding in his 1865 Annual Report, to the causes of sickness in this corps, says that he "cannot attribute the mortality to any certain cause, and must therefore put it down to many, such as climate, intemperance, the general want of stamina and physique in the present recruits enlisted for the army; this latter cause was very palpable, in the last draft just arrived, consisting of mostly young, pale, worn-out looking lads, stunted, and in many instances bearing the features of mature age. It is my idea that all those recruits should be sent to Wellington until their drill is finished, and then sent to the plains in accordance with their health; a great number of the dysentery cases occurred amongst the draft that arrived in the end of 1864."

And, in connexion with this subject, it has seemed to me that not only have diseases of certain classes been more frequent, but that much of the asthenic character of ailments, so marked during the past few years, has its origin in the lower condition of the persons attacked. Assistant Surgeon Simon, M.D., B-23d Brigade Royal Artillery, has several times drawn my attention to the fact that the men who have been attacked with hepatic inflammations, have, for months before, been falling off in person.

* * *

[Here follow some remarks upon the ration of the Soldier, and upon the propriety of changing the hours at which the meals are served, with a recommendation that Government should allow a cup of hot tea or coffee and some bread stuff to each Soldier before morning parade, a necessary refreshment for which very few soldiers can afford to pay. The dietary for the sick in hospital next comes under review. The Geology of the Station is then noticed, and this is followed by an account of seventeen native villages dispersed in and around the Cantonment. This account is carefully

drawn up evidently from repeated personal inspection of the places alluded to. We here resume our extracts.]

Two of the Medical officers in their Annual Reports notice these villages and their cultivated ground.

Their remarks are doubtless merely repetitions of what has already appeared in printed papers, but it is proper to place their names here. Assistant Surgeon Ramsbotham says that " Amongst the most important causes of disease, * * * may, I think, be enumerated the dryness and high temperature, the numerous foci of malaria existing in and around the Cantonment, and the saturation of the soil with organic impurities in and round the spots occupied by the native population, with the resulting impurity of the atmosphere. The last cause, I am inclined to think, a very important one as regards the causation of Dysentery, and more connected with the production of the disease as an endemic one, than malaria itself.

"My limited experience of this Station, leads me entirely to concur with Dr. Crawford on the necessity of a General Sanitary Supervision of the whole Cantonment, and to regard the 'neutral strips' occupied by the natives as the common receptacles of the excreta of the community and fruitful sources of miasmata.

" There is no doubt that both in and around the Cantonment of Secunderabad, the main conditions of development of malaria exists; it is not simply that low swampy tanks and extensive rice-fields (which are ordinarily recognized sources of malaria) abound, but a high temperature acting on a surface previously moistened and even independent of any decaying vegetable matter, in the process of drying up, will, in all probability, generate malaria; the essential moisture is in the subsoil, for, as I have already frequently mentioned, subsoil drainage in the Cantonment does not exist, and is a question altogether of the future; the nature of the soil is one also which is supposed to favour the extrication of malaria, viz., a dry, loose, open disintegrated granite one, mixed here and there with disintegrated trap or hornblende, forming a black soil; hence it is porous, penetrable, retentive of moisture, and in all probability also contains both animal and vegetable matters undergoing decay. In Secunderabad itself, I conceive malaria is generated both by the tanks so frequently referred to, the rice-fields, and the

subsoil generally; while in Trimulgherry the latter source seems to be the principal agency at work, as the tanks are fewer, smaller, more distant, and the rice cultivation very limited in amount. This difference may, I think, be fairly considered the reason why malarial fevers have been so much less frequent in the one station than in the other. The ratio per 1000 at Secunderabad in the three Batteries is 176·8, 306, and 194·6, while in Trimulgherry it has only been 84·5 and 46. I may here mention an interesting fact connected with the Statistics of the B-D and B-23rd Batteries, that the belt of trees referred to as separating the lines of the B-D from the swampy tank, and which, by Dr. Ranking and others, was considered one of the principal reasons of the different rate of sickness in the two Batteries, does not seem, in 1865, to have caused that immunity from fevers which it was formerly supposed to do; thus, while the men occupying the protected barracks give a ratio of 306 admissions per 1000 for malarial fevers, those in the unprotected ones give only 176·8, but if a comparison is made between the two batteries as regards the prevalence of diarrhœa and dysentery, the reverse obtains, and while the B-D shows a ratio of 476 per 1000, the B-23rd shows 646. This fact, coupled with that mentioned above, seems, I think, to show that malaria alone is only one, and perhaps even not the most important one, of the causes of zymotic disease at this station; and I therefore allude, secondly, to what, I think, another and very important cause, viz., the saturation of the soil with organic impurities, and the non-sanitary condition of the bazaars and native locations in the very midst of the troops. Their general condition may still be described in the words of the report of the Commissioners in India; that 'there are no regulations as to the general arrangement of the houses, the width and direction of streets, drainage or water supply; the habits of the natives such that they cover the whole neighbouring surface with filth, and, if there be any ravines or pits in the neighbourhood, convert them into dangerous nuisances; there are generally no public necessaries, there are often cess-pits among the houses, and the surface drainage sometimes flows into tanks from which the water-supply is derived.' The tank, previously referred to, is commonly resorted to by the natives for purposes of nature, they wash themselves and their clothes in it, their cattle and horses, besides which cattle graze around the low shelving margin; hence, it cannot be doubted that with the

drying up of the ground after the rains, organic impurities must thoroughly saturate the soil and contaminate the atmosphere with enteric emanations. There can be no question that impure air from putrefying animal substances, like the gases and vapours from sewers, or the air from very foul latrines, is a fertile source of dysentery and diarrhœa. I am strongly inclined to believe that dysenteric stools contain a communicable poison, and the prevalence of dysentery, at this station, as an endemic disease, I am disposed to believe, is owing in great measure, to organic emanations from a soil saturated with enteric and other organic impurities.

"The above two causes of zymotic disease are aided, thirdly, by the high temperature and dryness of the air. This increases some of the organic functions, while it tends to depress the animal ones; it probably increases the hepatic functions and modifies and alters in its sensible qualities the bile secretion, and so tends to disorder the stomach and intestines; it appears to cause less necessity for animal heat, hence less demand for food, diminished metamorphosis of tissues, and decreased excretion; errors of eating and drinking in the way of excess, (and both are not uncommon in India) tend to produce derangement of the abdominal viscera; defective elimination of hydro-carbons by the lungs, under diminished heat generation, throws more work upon the liver.

*   *   *   *

"General sanitary measures cannot be carried out in the station as long as the Nizam holds control over the patches of ground in and close to the station. Surface-drainage should be allowed to flow away as quickly as possible, and water courses made through all the low ground, instead of which it is now collected in shallow ponds for irrigating purposes, and at times gives off most offensive odours."

Meteorology.—The meteorological phenomena of the cantonment, as illustrable by the wind and rains may be here noticed.

The rain-fall at Secunderabad varies considerably, as the following table will show:—

Year.		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1856		...	...	0·44	1·61	1·84	5·34	4·41	7·93	2·51	6·91	4·38	0·07	35·24
1857		...	...	...	0·97	6·16	2·94	4·37	0·98	3·76	2·50	1·55	...	23·23
1858		...	..	...	...	0·73	4·63	3·82	2·61	7·89	1·64	...	...	21·32
1859		...	...	...	1·20	0·67	0·07	1·83	5·70	1·69	1·76	0·01	...	12·93
1860		...	...	0·03	...	0·02	2·59	4·48	3·13	5·70	2·02	...	...	17·97
1861		1·00	..	1·15	...	0·10	200	5·75	7·41	1·85	0·54	...	...	19·80
1862		1·68	0·40	0·14	0·29	...	3·55	3·55	2·33	3·75	9·64	7·08	0·19	32·60
1863		0·30	...	...	1·20	0·93	2·53	5·27	8·22	6·05	2·07	...	...	26·57
1864		...	...	...	0·15	1·77	7·96	7·01	4·02	5·15	...	2·71	...	28·77
1865		...	1·39	0·02	2·07	2·36	2·79	4·58	7·82	5·84	0·73	0·60	...	28·20
For the 10 years.	Total...	2·98	1·79	1·58	7·49	14·58	34·40	45·07	50·15	44·19	27·81	16·33	0·26	246·63
	Average.	·298	·179	·158	·749	1·458	3·440	4·507	5·015	4·419	2·781	1·633	·026	24·663

Varying from 12·93 in 1859, to 35·24 in 1856. During the ten years from 1856 to 1865, the average fall of rain has only been 24·663 inches. In all the four months of December, January, February and March, only 0·63 inches fall, but in June, July, August, September and October 17·37 inches fall on the average.

The prevailing winds of the place are easterly and westerly, veering to the north or south, and it is when those from the west, and south-west and north-west, are blowing, that the principal rains fall and the more severe diseases occur.

In the past three years there are recorded at Secunderabad, forty-six variations of the wind.

* * * *

In twenty-five instances they have been easterly, veering to the north-east or to the south-east, to an equal extent; then easterly winds blowing in the months of January, February, March, April, October, November, and December. Nineteen entries are of westerly winds veering to the north-west or south-west, in the months of February, April, May, June, July, August, and September, and it is while the rains are falling, in the months in which westerly winds prevail, but also in the month of October, that the severer forms of sickness occur.

25 Easterly.	9 East winds, viz., 1 January, 2 March, 2 April, 3 October, 1 December.
	8 South-east, 1 January, 3 February, 1 March, 1 April, 2 December.
	8 North-east, 2 January, 1 February, 2 October, 3 November.

2 North winds, viz., 1 January and 1 September.

19 Westerly.	13 West winds, viz., 1 May, 3 June, 3 July, 3 August, 3 September.
	2 North-west, viz., 1 February, and 1 September.
	4 South-west, viz., 1 April, 1 May, 1 June, 1 August.

The following memoranda will show, for **1865** *the number of times the wind blew from various points of the compass:—*

Points of Compass.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
N.	...	...	1	...	1	...	3	6	1	2	...	...	...	...	...	...	17	18	16	12	...	...	...	1
N. N. E.	...	...	...	3	1	...	1	1	2	7	3	...	...	...	...	...	...	...	4	15	27	27	3	19
N. E.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
E. N. E.	...	2	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
E.	14	20	3	5	13	19	5	15	...	...	1	3	...	...	...	...	...	...	...	2	...	...	...	7
E. S. E.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
S. E.	13	5	14	12	10	10	6	1	...	2	...	...	...	...	...	...	...	...	...	2	...	1	...	2
S. S. E.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
S.	5	4	4	2	5	1	5	3	...	...	...	...	...	...	...	1	...	1	1	...	1	1	21	2
S. S. W.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
S. W.	1	...	3	2	1	...	15	...	8	4	1	...	1	...	...	...	...	...	...	...	1	...	5	...
W. S. W.	...	...	...	...	...	...	...	...	...	...	23	...	...	...	...	...	...	...	...	...	...	...	...	...
W.	...	...	...	1	...	...	4	...	16	13	...	25	28	29	31	30	11	8	...	...	...	...	2	...
W. N. W.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
N. W.	...	...	...	3	...	1	2	4	4	3	2	2	2	2	...	...	2	3	...	...	1	1	...	...
N. N. W.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

It will be seen from this that the winds have been easterly and westerly, veering to the north and south. There have in all, in 1865, been 762 recorded changes in the wind; of these 312 winds blew from the east with a southerly or northerly tendency, and 285 blew from the west, veering to the south or north.

Sickness and Mortality.—It is very unsafe even in temperate climates to generalize from the data of a limited period. But if not advisable where the elements of disease are few, it is still less so in the tropics where they abound, and where there occur cycles of unhealthiness and cycles of salubrity, without the causes in either case being traceable. The following observations on the 1865-6 sickness may, however, be deemed of interest.

In reviewing the 1865-6 condition of the troops, it may be noticed, that the average strength of the European and

Native soldiery has been almost at the same height, of about 2500. The admissions of the Europeans have been 3678, and as 163 remained sick on the 1st of May 1865, the total treated in the past year were 3841. Each European soldier, therefore, has been about 1½ times in hospital in the course of the year. Of these admissions, the fewest occurred in January and February 1866, May 1865, and April and March 1866, and the most numerous admissions in June, December, November, July, August, October, and September of 1865.

Fewest admissions.		Largest admissions.	
1866 Jany. 221 Feby. 221 1865 May 240	1866 April 242 March 282	1865 June 302 Decr. 308 Novr. 316 July 356	1865 Aug. 379 Oct. 397 Sept. 414

The ranging of sickness would seem to follow the aridity or humidity of the seasons. During the dry weather, whether hot or cold, the admissions are few. But with the rainy season the admissions increase, and in September, when the rain fall has been most continuous, and the ground has become most saturated with moisture, the admissions are greatest.

[Here follow some extended remarks upon the water-supply and general conservancy of the station.]

The average strength of the European soldiers at Secunderabad in 1865 was 2732·22. The average daily sick was 182·15; and the strength was nearly twice in hospital, for 4427 were admitted, of whom 59 died,—other 4 deaths have occurred out of hospital. The rate of admissions to strength, viz., 1616 per 1000, seems high, but the recent change commanding men not to be detained more than twelve hours without admitting them, prevents comparison with older times. The death rate, including in and out of hospital, was 23 per 1000 of the strength.

The rates for the past twenty-two years have been as under :—

Years.	European Artillery. Average strength.	Average sick to strength.	Total admissions each year.	Total deaths each year.	Percentage of deaths to strength.	European Infantry. Average strength.	Average sick to strength.	Total admissions each year.	Total deaths each year.	Percentage of deaths to strength.	Years.
1837	120 3/12	9 1/3	258	5	4 1/8	851	9 1/3	1463	125	14 11/16	1837
1838	96 10/13	8	204	5	5 1/4	728 1/2	9 1/3	1316	52	7 1/8	1838
1839	96 6/12	9 3/4	162	6	5 3/4	603 1/4	9 1/4	1172	37	5 7/8	1839
1840	104 8/12	6 1/4	169	0	0	604 5/12	9	1256	32	5 1/4	1840
1841	115 9/12	4	153	4	3 1/2	855 9/12	7 3/4	1859	33	3 7/8	1841
1842	104 4/12	3 13/16	116	2	1 7/8	945 1/2	7 1/4	1773	49	5 1/8	1842
1843	101	2	77	0	0	824	9 2/3	1608	90	9 1/6	1843
1844	93	4 1/3	108	6	6 1/2	904	7 3/4	1526	58	6 1/2	1844
1845	80	3 1/8	75	0	0	1004	5 1/3	1445	30	2 9/10	1845
1846	159	7 1/8	128	6	3 3/4	924	8 2/3	1790	62	6 2/3	1846
1847	149	7 1/2	212	6	4 1/9	1052	7 1/2	1749	37	3 3/5	1847
1848	158	6 3/8	253	2	3 1/4	1099	6 9/11	1633	29	2 4/5	1848
1849	179	6 1/8	264	4	2 1/4	431	5 1/8	85	0	0	1849
1850	170	5 1/3	252	8	4 1/8	980	6	1663	22	2 1/4	1850
1851	176	4	188	1	1/2	988	7 2/3	1958	62	6 1/4	1851
1852	186	5 1/2	248	5	2 2/3	964	7	1781	5	1/2	1852
1853	150	5 1/3	206	0	0	905	7 1/6	1580	12	1 1/3	1853
1854	84	6	128	2	2 1/3	637	7	1659	36	5 2/3	1854
1855	115 3/4	6 5/11	196	4	3 1/2	852	10 1/4	1961	18	2 1/9	1855
1856	175	8	311	5	2 1/6	812	5 3/4	1302	10	1 1/8	1856
1857	134	6 3/4	243	2	1 1/2	1067	3 1/3	1753	20	1 9/10	1857
1858	95	6 1/3	140	3	3 1/8	1180	9 2/3	1161	110	10 1/2	1858
Average.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	42	5	Average.

The data from 1837 to 1858 in the above table were furnished by Inspector General Macpherson, to exhibit in contrast the sanitary condition of the European Troops occupying the Artillery and Infantry Barracks for a period of 22 years; and he remarks that, it will be observed that the Artillery lost, on an average, $2\frac{6}{11}$ per cent., and the Infantry 5 per cent.; and while the Artillery had $5\frac{7}{11}$ per cent. constantly sick, the Infantry had $7\frac{8}{11}$.

In a period of sixteen years, from 1842 to 1858, in an aggregate strength of 20,529 European troops who served with the Hyderabad Subsidiary Force, the following were the admissions and deaths, from—

Cholera.		Fevers.		Hepatic affections.		Diarrhœa.		Dysentery.		Rheumatic affections.		Venereal affections.		Thoracic affections.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
125	50	7585	56	1707	91	2048	32	4210	297	1768	16	6711	9	1193	41

The 59 deaths in hospital in 1865 occurred in 1,906 admissions from twenty diseases; but 49, or the bulk of these fatal cases, died of six classes of ailments; twenty of the casualties being from hepatitis, nine from dysentery, and eight from fever. Of six cholera admissions five, and of four asthma cases two, died. Very many of the fatal dysenteric cases have been found associated with hepatic abscess.

Diseases.	Admitted	Died.	Ratio of Deaths to Admissions.
Dysenteria Acuta.........	532	6	1 in 88·6
„ Chronica......	109	3	1 „ 36·3
Cholera Spasmodica.......	6	5	1 „ 1·2
Febris Typhoides.........	8	3	1 „ 2·6
„ Intermittens.......	427	4	1 „ 101·7
„ Remittens..........	28	1	1 „ 28
Asthma.......................	4	2	1 „ 2
Phthisis Pulmonalis......	15	5	1 „ 3
Hepatitis Acuta...........	234	14	1 „ 16·7
„ Chronica........	86	6	1 „ 14·3

The immunity from fatal cases enjoyed by the B. Battery D. Brigade Royal Horse Artillery at Russulpoor, was marked. Out of a strength of 138·4 they had 258 admissions, but only one death, and that occurred out of hospital from insolation.

The B. Battery 23rd Brigade Royal Artillery were located quite near to them; out of an average strength of 165·08 they had 350 admissions, and six deaths from dysentery, fever, and liver disease. The peculiarity in this Battery's sanitary condition has been the frequency with which certain men with grave ailments were admitted in 1865.

Diseases.	Admitted	Died
Febris Intermittens....	32	1
,, Remittens.......	1	1
Dysenteria Acuta	62	1
,, Chronica...	20	1
Hepatitis Acuta.........	28	1
,, Chronica.....	29	1

No. 5-20 Brigade Royal Artillery, though treated in the same hospital with the sick of the B. Battery D. Brigade Royal Horse Artillery, and B Battery 23rd Brigade Royal Artillery, are located in intrenched barracks 1¾ miles to the North-East on a granite ridge. Their strength was 86·33, their admissions 115, and two died, one from dysentery and one from paralysis.

The B. 14th Brigade Royal Artillery, and D. 23rd Brigade Royal Artillery are located in North Trimulgherry. The B. 14th Brigade Royal Artillery, out of an average strength of 142·14, had 166 admissions, out of whom four died and one casualty was a suicide.

Diseases.	Admitted	Died
Dysenteria Acuta.....	29	2
Asthma.....................	1	1
Hepatitis Acuta.........	23	1
Suicide.....................	....	1

The D. 23rd Brigade Royal Artillery neighbouring the B. 14th Brigade were 169·41 strong. Their admissions 215, and deaths 7. This varied health of the Artillery Batteries is remarkable.

Diseases.	Admitted	Died
Diarrhœa..................	10	1
Phthisis Pulmonalis...	1	1
Hepatitis Acuta.........	12	3
,, Chronica....	12	2

Diseases which have proved fatal among the Artillery.

Battery.	Brigade.	Strength.	Admitted.	Died.	Number of daily sick.	Ratio per 1000 of strength.		Dysenteria Acuta.		Dysenteria Chronica		Diarrhœa.		Paralysis.		Hepatitis Acuta.		Hepatitis Chronica.		Asthma.		Suicide.		Insolatio.		Febris Intermittens.		Febris Remittens.		Phthisis Pulmonalis.	
						A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
B.	D.	138·40	258	1	8·27	1864	7·2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
B.	23rd	165·08	350	6	16·25	2180	36·3	62	1	20	1	...	...	...	...	28	1	29	1	...	...	...	...	...	...	32	1	1	1	...	...
No.5	20th	86·33	115	2	3·73	1332	23·1	16	1	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
B.	14th	143·14	166	5	7·93	1167	35·1	29	2	...	...	...	...	...	...	23	1	...	...	1	1	...	1	...	...	...	...	...	...	...	...
D.	23rd	169·41	215	7	10·15	1268	41·3	20	...	...	...	10	1	...	...	12	3	12	2	...	...	...	...	...	...	...	...	...	...	1	1

I think that these death-rates in the B-14th Brigade, B-23rd-Brigade and D 23rd-Brigade, Royal Artillery are high.

Assistant Surgeon Ramsbotham, M.D., Royal Artillery, gives the following summary :—

Summary of Admissions and Deaths in the Batteries of Royal Artillery stationed at Secunderabad and Trimulgherry, from 1st *January to* 31st *December* 1865.

Station.	Secunderabad.						Trimulgherry.				Total.	
Battery.	B-D R.H.A.		B-23rd R.A.		5-20th R.A.		B-14th R.A.		D-23rd R.A.			
Average Strength......	138·40		165·08		86·33		142·14		169·41			
Average Daily Sick.....	8·27		16·25		3·73		7·93		16·15			
Diseases.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	Admitted.	Died.
CLASS I.—ORDER 1.												
Tonsillitis..................	2	...	4	...	1	...	1	...	...	...	8	...
Febris Intermittens....	42	...	32	1	15	...	12	...	8	...	109	1
„ Remittens.......	1	...	1	1	...	...	...	...	...	...	2	1
„ Continua.........	...	...	2	...	1	...	1	...	1	...	5	...
Ophthalmia................	...	...	...	...	3	...	1	...	7	...	11	..
Furunculus...............	2	...	2	...	...	...	1	...	...	...	5	...
Dysenteria Acuta.......	23	...	62	1	16	1	29	2	20	...	150	4
„ Chronica...	11	...	20	1	2	...	18	...	17	...	68	1
Diarrhœa...................	37	...	31	...	12	...	3	...	10	1	93	1
Cholera biliosa...........	1	...	...	...	..	...	...	...	...	...	1	...
„ Spasmodica....	1	...	...	...	...	...	...	...	...	...	1	...
Rheumatismus Acutus.	4	...	9	...	1	...	1	...	4	...	19	...
„ Chronicus.	6	...	11	...	...	...	...	...	13	..	30	...

And this Officer further observes as follows :—" The Fevers have been, with seven exceptions, only of the intermittent type, and the quotidian variety of this by far the most common; as shown by the table in the margin, the B. Battery D. Brigade Royal Horse Artillery gives the highest ratio of admissions.

Miasmatic Diseases. Ratio per 1000.		Fevers. Intermittent and Remittent. Ratio per 1000.	
B-23rd..........	1000	B-D...............	306
B-D.............	920	B-23rd...........	176.8
5-20th...........	657	5-20th...........	194·6
B-14th..........	450	B-14th..........	84·5
D-23rd..........	447	D-23rd..........	4·6

Dysentery and Diarrhœa.	
Ratio per 1000.	
B-23rd	646
B-D	476
5-20th	394
B-14th	338
D-23rd	243

Dysentery and Diarrhœa have been very prevalent during the year, and I have already attempted to offer some explanation of the probable cause of such frequency in this station. The B/23rd Battery shows the highest ratio of admissions.

Mortality.—Ratio per 1000.			
Zymotic Diseases.		Hepatitis.	
B-23rd	24·80	B-23rd	12·15
5-20th	13·20	B-14th	7·00
B-14th	14	D-23rd	32·80
D-23rd	65		

Assistant Surgeon Simon, M.D., the medical officer B/14th and D/23rd Batteries Royal Artillery, has given the following contrasting statement of these two bodies :—

B-14th Brigade R. A.					D-23rd Brigade R. A.				
Average Strength.	142·14		Ratio per 1000		Average Strength.	169·41		Ratio per 1000	
Diseases.	Total treated.	Died.	Total treated.	Died.	Diseases.	Total treated.	Died.	Total treated.	Died.
Fevers	13	..	91·45	..	Fevers	9	..	53·25	..
Dysentery	55	2	387·32	14·08	Dysentery	43	..	254·43	..
Diarrhœa	3	..	21·12	..	Diarrhœa	10	1	59·17	5·91
Venereal	13	..	91·54	..	Venereal	36	..	213·01	..
Hepatitis	38	1	267·60	7·04	Hepatitis	25	5	147·92	29·58
Phthisis, P. T.	..	..	..	..	Phthisis, P.T	2	1	11·83	5·91
All other diseases	61	1	429·57	7.04	All other diseases	108	..	639·05	..
Total	183	4	1288·69	28·16	Total	233	7	1378·66	41·40

"These tables," he remarks, "show the relative amount of sickness in each Battery. The D/23rd Brigade R. A., it will

be seen, shows the highest rate of mortality and the fewest number of admissions for diseases of the liver and bowels. The deaths in this battery were increased by a number of men who joined during the latter part of the year suffering from confirmed organic disease, and who, on arrival, were unable to stand the climate of this station. During the months of August and September twenty-three men joined from Bellary and other equally hot stations, on the breaking up of certain field batteries, and before the end of the year these fresh arrivals gave 20 admissions and 3 deaths; the latter from hepatic disease alone. About the same time a number of men joined the B/14th Brigade R. A. in a more or less debilitated condition, and many of them have done little or no duty since their arrival."

"On the whole," he observes, "the women have been healthy, but the mortality among the children has been very high, no less than eight having died in the D/23rd Brigade Royal Artillery alone, during the year, from Dysentery, Diarrhœa, and Cholera. One woman also died from the latter disease. The Soldier's child in this country is rendered so susceptible for the induction of disease through the bad management of its parents; the diet, too, is ill suited to its wants; and, if it should happen to suffer at all from disease, its parents are so slow in bringing it to the knowledge of the Medical Officer that much valuable time is lost in treating the case. In addition, the climate at this station appears inimical to young children if we may judge from former returns; at any rate, they seem to waste and die."

The 1st King's Dragoon Guards, on the south-east of the Cantonment, had an average strength of 452·71 and 23·25 of average daily sick. The admissions were 629, and deaths 10, viz., in hospital 8, out of hospital 2. The ratio per 1000 admitted was 1389, which is not dissimilar to the artillery rate; but reckoning the hospital casualties only, the death-rate was 17·6 per 1000, and in-

Diseases.	Admitted.	Died.
Febris Typhoides..	1	1
„ Intermittens.......	78	1
Cholera spasmodica....	1	1
Phthisis Pulmonalis......	4	2
Ileus......................	1	1
Hepatitis Acuta..........	29	2
Total...	114	8
Out of Hospital...	...	2

cluding the two out of hospital, 22 per 1000. The ailments, causes of the deaths, were as per margin.

The medical officer, Surgeon-Major Jephson, M.D., makes a few observations on particular diseases. He mentions that "85 cases of Dysentery have been admitted; nearly all these were attacked when drinking the well-water in the barrack-square found by the Government Chemical Examiner to contain upwards of 6 grs. of organic matter to the gallon. About the last quarter of the year water brought from the Trimulgherry barrack-well, said to contain only 2 grs. of organic matter to the gallon, has been used, and since then very few fresh cases of Dysentery have occurred among the men of the Regiment. It is difficult preventing the men drinking the barrack well-water, as it is cooler and, the well being in barracks, the water is fresher than that brought a mile and a half in barrels in the sun. Some of the late cases of bowel complaint have admitted their imprudence in drinking this bad water, so that it is more than probable that most, if not all, of the men who suffer with Dysentery have been drinking the bad water up to the time they were attacked.

"Of Insolatio, four cases occurred during the year; one was a very slight case, and returned to duty in a few days. One was fatal. He was returning from musketry drill when he fell down insensible, and he was dead when he was brought to hospital. The other two cases were very bad ones and nearly proved fatal. The weather at the time was particularly hot, close and oppressive; not a breath of wind blowing; Barometer and Thermometer particularly high, the latter 96° in the wards of the hospital. Several other cases occurred about the same time in other corps in the station, and proved fatal.

"Of the women and children two out of eight cases of Dysentery admitted into hospital proved fatal, but more than twice this number were treated in their own quarters. One woman died of abscess of the liver."

The 18th Royal Irish and 108th Regiments were located nearly together; the former in North, the latter in South Trimulgherry; and their relative sickness and mortality may be compared together as under:—

Corps.	Strength.	Daily sick.	Total.		Ratio per 1000.	
			Admitted	Died.	Admitted	Died.
Her Majesty's 18th Royal Irish............	802·07	61·53	1316	15	1640	18·7
Do. 108th Regiment.............	742·08	49·04	937	17	1276	22·9

The diseases which proved fatal, their admissions and deaths, were as under:—

Corps.	Febris Typhoides.		Febris Intermittens.		Dysenteria Acuta.		Dysenteria Chronica.		Cholera Spasmodica.		Syphilis Secondaria.		Phthisis Pulmonalis.		Delirium Tremens.		Bronchitis Acuta.		Asthma.		Hepatitis Acuta.		Hepatitis Chronica.		Icterus.		Insolatio.		Asphyxia.		Vulnus Sclopitorum.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
H. M.'s 108th Regiment. ..	5	1	113	2	196	2	32	2	3	3	11	1	6	1	2	1	12	1	1	1	38	1	5	1	...	...	...	...	...	...	...	...
" 18th Royal Irish.	2	1	...	...	...	...	...	...	...	...	...	...	3	1	...	...	...	...	...	...	79	6	18	2	1	1	1	1	1	1	1	1

There is little difference between the two corps as regards the death rates; the sick admissions ratio 1640 and 1276 are very dissimilar. But while the 18th Royal Irish admissions were 1640, their casualties, from six ailments, were only 18·7 per 1000 of the strength; but with 1276 per 1000 sick in the 108th, 22·9 per 1000 died. Dracunculus was common.

"This extraordinary disease attacked the regiment in the month of August last in the most unaccountable manner, raising the ordinary percentage of sick from 5½ to 9, and causing no less than 115 men to pass through the Hospital from that time to the end of the year. Various reasons and theories have been advanced here as well as elsewhere* to explain the origin of this parasite, but," says the medical officer, "nothing yet has been satisfactorily discovered to prove its source to my mind. The most probable origin, no doubt, is in the bathing water, but I am not at all satisfied that it originated there, as many men who suffered from it positively stated that they never bathed; besides, amongst the women and children there was not a single case. It broke out last year in a similar way amongst the 18th Royal Irish Regiment who were located in the next barracks, and I had an idea that it was communicated from one Regiment to the other, as the sick of the 108th were removed into the part of the Hospital previously occupied by the 18th Royal Irish. But here again I am met by the fact that many men who had not been in hospital at all were attacked. It appears that up to five months before the disease showed itself, the men were in the habit of bathing in a small dirty tank about one mile from the barracks; the idea suggests itself at once that it originated here, but many of the men positively assert that they never bathed in this tank, and yet they had the worm. The men themselves state they got it from drinking the water at the main-guard; that it was there the 18th Royal Irish got it, and that when they took it over from them they got the guinea-worm also. But none of the Arsenal people who drink the water have it. Further, this main-guard being a long way from the barracks, I am inclined to think that this idea was started by the men in the hope

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*See some remarks on this subject on pages 452 to 461, vol. i. of this Journal.—Ed. *M. Q. J.*

that they would be relieved from this duty. I am afraid, indeed, that I cannot add much to what is known already about this parasite, but I am very much inclined to think with Dr. Green that it exists as much in the soil as in the water, and in no instance could I detect anything like the Filaria as I saw them under the microscope when taken from a patient. But it is my intention," he adds, "still to continue investigations, and should I discover anything calculated to throw any light on this interesting question, I will forward it in a special report. Indeed, what I have seen coincides in most particulars with the able remarks in Dr. Aitken's book on this subject; the appearances under the microscope were exactly as he depicted them in the many specimens examined by me. The worst feature about the disease is the length of time a man is laid up; on an average, 30 days, I computed that men were unfit to do duty. One man was 79 days in Hospital: the worm appeared in the fore-arm and was broken in extraction, setting up intense inflammation and suppuration, a large piece sloughing away. Another man had seven in all extracted. In another case the worm was felt over the pubes and passing down the inner side of the thigh; the whole tract sloughed in this instance. The lower extremities, with the exception of two in the arms, one in the scrotum, and three or four about the groins, suffered entirely; but it is a most remarkable fact that not one of the drafts that arrived in the end of 1864 were attacked, although many of them must have bathed in the aforesaid tank. This, I think, goes a great way to prove that the worm takes at least twelve months to develop and come to maturity. Last year the Surgeon of the 18th Royal Irish Regiment had the well from which the water was supplied to the plunge-bath of his Regiment closed, and water brought from another well. This he flattered himself would stop the disease, and the disease did cease. But I am glad to say that it has disappeared also from the 108th without having to close up any well. Believing that this changing the well had something to do with its disappearance, I intended to recommend the same, but having satisfied myself, through the microscope, that the germs did not exist in the mud or water of the well in use, I declined to alter it, and now I have no doubt that I was right. You must bear in mind that this regiment had no communication with the other except in the General Hospital; their water being supplied in barracks from a

different source. Moreover, the 18th Royal Irish never bathed in the tank mentioned before.

* * *

" The first case from Dracunculus was admitted into Hospital on the 15th of August 1865, and the last, in the year, on the 31st of December 1865, being in all 115 cases that passed through the Hospital during the above period."

* * * *

NATIVES.—The Native Soldiery in 1865 had an average strength of 2809, of whom 76·84 were daily sick, and 73 died. The ratio per 1000 of strength treated was 595, and of deaths 22·4, a very high rate of mortality, but caused by an out-break of Cholera in the 4th Regiment M. N. I. while marching here from Madras.

The state of the Sappers and Miners is indicated by the marginal note. Their sick rate has been greater than that of any other of the bodies of Native Soldiery here. The Medical Officer attributes this to their having been in a feverish country, partly to exposure and partly to their habits. The position of their lines near the hamlet of Balam Rai, on the eastern slope of a sheet of wet cultivation, may also be a cause of this. Their water-source also is not good, and the water might advantageously be filtered.

Sappers and Miners.	
Strength...	214
Admissions from all Diseases...	175
Deaths	0
Average daily sick	7

The state of the Cantonment Hospital has been as per margin. The custom has been to treat the civil prisoners here, and while some of the Europeans have been treated here, others have been under the care of the Royal Artillery at Begumpettah, and others of them in the European Infantry Hospital at Trimulgherry, the cantonment receiving in return the native sick from the mounted and infantry corps. I have obtained the sanction of the Resident at Hyderabad to build a new hospital for the prisoners. Under the Principal Inspector General's orders the native sick of other corps are to be treated by their res-

Cantonment Hospital. Average Strength 176.		
Diseases.	Admitted.	Died
Paralysis	1	1
Abscesses	6	1
Contusio	12	1
	19	3
All other diseases ..	62	
Total...	81	3
Average daily sick...		4

pective Medical Officers, and for the Europeans being treated here arrangements will be made. There has been a tendency to foul ulcers amongst them, the first part of which the Medical Officer considers to have been caused intentionally. Several gave this appearance, but I have been more inclined to attribute it to imperfect ventilation and insufficient space, and have recommended further enlargements of the jail.

The Medical Officer has remarked on the wretched neighbourhood and position in which the Ordnance are located. Their cholera cases were four, and those of the Commissariat one.

The occurrences in H. M.'s 2nd Regiment Madras Light Cavalry, are noted in the margin. Cholera continued to appear in the Cantonment in solitary cases from February to September, but the only cases treated in this corps were sent in from the Residency Escort. The two hepatic cases were of the Sergeant Major and Quarter Master Sergeant, and both had abscesses, and six days before the death of the latter the liver was punctured and sixty ounces of pus evacuated.

2nd Madras Light Cavalry.		
Average Strength 359.	Admitted.	Died.
Cholera Spasmodica...	4	3
Dracunculus........	25	1
Hepatitis Acuta	1	1
Do. Chronica....	1	1
	31	6
All other Diseases......	144	0
Total..	175	6
Average daily sick 11.		

The state of the 4th Regiment M. N. I., has been as per margin. This Regiment suffered severely during 1865. With a strength of 698, the total admissions have been 487, and deaths 50. It marched from Madras on the 13th January and reached this station on the 15th March. The ailment broke out at Ongole on the 6th February, and disappeared only at Oopal on the 11th March; 44 died during the outbreak,

4th Regiment M. N. I.		
Average Strength 698.	Admitted.	Died.
Febris Intermittens....	194	3
Diarrhœa..............	29	2
Cholera Spasmodica...	104	44
Apoplexia..............	1	1
	328	50
All other Diseases......	159	0
Total..	487	50
Average daily sick 16.		

15 per cent. (of strength) were attacked, and 44 or nearly 6 per cent. (of strength) died. I give on the margin the strength of the year. It will be seen that one-seventh of the Hindus, one-seventh of the Mahomedans, and of eleven European Officers, three were attacked. But of those attacked, one out of every 2 Hindus died, one out of every 3·6 Mahomedans; but all the three attacks of the European Officers proved fatal. In the year 1865 there have been 335 Hindus, or somewhat over one-third [three-fourths ?] admitted; but of Mahomedans 148, or a little less [more ?] than one-half the strength, but in either case one out of every ten [treated in hospital] have died.

Race.	Strength.	Cholera.		All diseases.	
		Attacks.	Deaths.	Admitted.	Died.
Hindus...........	421 ?	61	30	335	33
Mahomedans......	280 ?	40	11	143	14
European Officers.	11 ?	3	3	0	0

This Regiment, after its arrival here, had in March and April, till the 20th May, from 13 to 28 sick in hospital, June and July few sick, but in September, October, November and December, the admissions and average daily sick greatly increased, ranging to, in all ranks, as per margin. The prevailing ailment in Secunderabad has been a mild form of quotidian intermittent, the paroxysms occurring within an hour or two of noon or midnight. This seems to have been the character of the ailments in Her Majesty's 19th Regiment M. N. I., which preceded the 4th M. N. I. in their Lines.

1865.	Men in Hospital.	
Months.	Maximum.	Minimum.
August - -	20	8
September	28	16
October - -	30	15
November	35	19
December -	51	35
January - -	29	21
February -	44	28
March - - -	49	28
April - - - -	61	37
May - - - -	67	41

32nd Regiment M. N. I.		
Average strength 712.		
	Admitted.	Died.
Febris Intermittens......	190	1
,, Remittens........	1	1
Erysipelas................	1	1
Diarrhœa	12	1
Cholera Spasmodica.....	6	3
Syphilis Secondaria.....	3	1
Bronchitis Acuta.........	5	1
Out of Hospital..........	...	1
	218	10
Other Diseases............	169	...
Total...	387	10
Average daily sick 16·84.		

The health state of the 32nd Regiment M. N. I. has been as per margin. During the months of August and September, intermittent fever of a mild form prevailed.

The 38th Regiment M. N. I. have been singularly healthy during the year,* as the marginal note will show. There were seven changes in its medical attendants.

38th Regiment M. N. I.		
Average strength 650.		
	Admitted.	Died.
Cholera Spasmodica.....	3	3
Phthisis Pulmonalis.....	2	1
Bronchitis Chronica.....	3	1
	8	5
Other Diseases..........	361	...
Total...	369	5
Average daily sick 22.		

The three casualties from cholera occurred at the Residency.

*[NOTE.—With all due deference we must point out that the returns given do not quite bear out this statement. The average daily sick was 22, higher than that of any of the other Native Corps at Secunderabad. And the admissions to strength were higher than those of the other Corps with the exception of the Sappers and Miners, and the exceptionable 4th N. I. with 104 cases of cholera which occurred during its march and before its arrival at Secunderabad. The Returns show simply a less proportion of fatal cases in the 38th than occurred in the other Native Regiments.—ED. *M. Q. J.*]

The following is a general summary :—

Native Troops.

	2d Light Cavalry.	4th Nat Infy.	32d Nat. Infy.	38th Nat. Infy.	Sappers and Miners.	Canton-ment Hospital.	Total.
Average Strength............	359	698	712	650	214	176	2809
Admitted........................	175	487	387	369	175	81	1674
Died................................	6	50	9	5	...	3	73
Average daily sick...........	11	16	16·84	22	7	4	...

Number of Admissions and Deaths of Diseases in which Casualties occurred.

DISEASES.	2nd L. E.		4th N. I.		32d N. I.		38th N. I.		Sappers.		Canton-ment.		Total.	
	A.	D	A.	D	A.	D	A.	D	A.	D	A	D	A.	D
Cholera Spasmodica.........	4	3	104	44	6	3	3	3	...	...	...	...	117	53
Diarrhœa..................	5	...	29	2	12	1	9	..	7	...	1	...	63	3
Febris Intermittens..........	11	...	194	3	190	1	218	..	78	...	36	...	727	4
,, Remittens............	...	...	8	...	1	1	...	..	...	...	...	...	9	1
Erysipelas..................	...	...	...	...	1	1	...	..	...	...	...	...	1	1
Syphilis Secondaria	...	...	...	...	3	1	...	..	...	...	...	...	3	1
Dracunculus................	25	1	3	...	6	..	7	..	..	...	...	...	41	1
Phthisis Pulmonalis........	...	...	1	...	..	..	2	1	..	...	...	...	3	1
Paralysis....................	...	...	...	...	1	..	1	..	..	...	1	1	3	1
Bronchitis Acuta.	2	...	13	...	5	1	2	..	5	...	...	...	27	1
,, Chronica........	...	...	...	...	7	..	3	1	..	...	...	...	10	1
Hepatitis Acuta............	1	1	2	...	..	..	1	..	...	...	...	...	4	1
,, Chronica..........	1	1	...	...	1	..	...	..	..	...	...	...	2	1
Abscessus	...	...	4	..	5	..	15	..	4	...	6	1	34	1
Contusio....................	32	...	2	...	..	..	8	..	16	...	12	1	70	1
Apoplexia..................	...	...	1	1	..	..	...	..	...	...	...	..	1	1
Total..	81	6	361	50	238	9	269	5	110	...	56	3	1115	73
All other diseases....	94	...	126	...	149	..	100	...	65	...	25	...	559	...
Grand Total..	175	6	487	50	387	9	369	5	175	...	81	3	1674	73

European Troops.

	B-D Brigade R. A.	B-14th Brigade R. A.	Hd. Qrs. and B-23rd Brigade R. A.	D-23rd Brigade R. A.	5-20 Brigade R. A.	1st K. D. G.	18th R. I.	108th Regt.	Cantonment Hospital.	Total.
Average Strength....	138·4	142·14	165·08	169·41	86·33	452·71	802·07	742·08	34	2732·22
Admitted....	258	166	330	215	115	629	1316	937	41	4027
Died { Out of Hospl..	1	1	..	..	..	2	...	..	..	4
Died { In Hospital...	..	4	6	7	2	8	15	17	..	59
Average daily Sick...	8·27	7·93	16·25	10·15	3·73	23·25	61·53	49·04	2	...

Number of Admissions and Deaths of Diseases in which Casualties occurred.

DISEASES.	B-D.		B-14.		B-23.		D-23.		5-20		K.D.G.		18th R. I.		108th.		Cant.		Total.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Dysenteria Acuta	23	..	29	2	62	1	20	...	16	1	79	...	105	..	196	2	2	...	532	6
,, Chronica	11	..	18	...	20	1	17	...	2	...	6	...	3	..	32	2	...	...	109	3
Diarrhœa	37	..	3	...	31	...	10	1	12	...	52	.	73	..	32	...	4	...	254	1
Cholera Spasmodica	1	..	..	...	...	...	...	...	...	...	1	1	1	1	3	3	...	...	6	5
Febris Typhoides	..	..	..	...	...	...	..	...	..	.	1	1	2	1	5	1	...	...	8	3
,, Intermittens	42	..	12	.	32	1	8	...	15	...	78	1	108	..	113	2	19	...	427	4
,, Remittens	1	..	..	...	1	1	...	...	...	...	2	...	22	..	2	...	...	...	28	1
Syphilis Secondaria	1	..	3	...	12	...	5	...	...	...	8	...	18	..	11	1	...	...	58	1
Paralysis	..	..	..	...	...	...	...	...	1	1	2	..	2	..	2	...	...	...	7	1
Delirium Tremens	..	..	1	..	...	...	...	...	...	...	4	...	2	..	2	1	...	...	9	1
Asthma	..	..	1	1	...	...	...	...	...	...	..	...	2	..	1	1	...	...	4	2
Phthisis Pulmonalis	..	..	..	...	1	...	1	1	...	...	4	2	3	1	6	1	...	...	15	5
Bronchitis Acuta	4	..	2	...	2	...	1	...	6	...	22	...	62	..	12	1	...	...	111	1
Hepatitis Acuta	18	..	23	1	28	1	12	3	7	...	29	2	79	6	38	1	...	...	234	14
,, Chronica	6	..	12	..	29	1	12	2	1	..	3	...	18	2	5	1	...	...	86	6
Ileus	..	..	..	...	...	..	...	...	...	...	1	1	..	..	...	...	...	..	1	1
Icterus	..	..	2	...	...	...	2	...	...	...	2	...	1	1	2	..	...	..	9	1
Vulnus Sclopt	..	..	..	...	...	...	...	...	...	...	...	...	1	1	1	...	...	..	2	1
Insolatio	..	..	..	...	...	...	...	...	...	...	4	...	1	1	...	...	...	...	5	1
Asphyxia	..	...	..	...	...	...	...	...	...	...	...	...	1	1	...	...	...	..	1	1
Total	144	..	106	4	218	6	88	7	60	2	298	8	504	15	463	17	25	...	1906	59
All other diseases	114	..	66	...	132	...	127	...	55	...	331	...	812	..	474	...	16	...	2121	...
Grand Total	158	..	172	4	350	6	215	7	115	2	629	8	1316	15	937	17	41	...	4027	59

[This interesting report concludes with a description of the barrack accommodation available for the several corps.]

ART. XI.—*History of an Epidemic of Dysentery, which occurred at Bangalore, among the 16th Lancers, in June and July,* 1866. By C. A. INNES, Esq., M.D., Assistant Surgeon, 16th Lancers.

AT the end of last May bowel disease prevailed to a considerable extent among the men of the 16th Lancers :—

	Admissions from		Deaths.
	Dysentery.	Diarrhœa.	
May 1866............	1	5	...
June „	14	10	2
July „	10	9	1
Total...	25	24	3*

The Regiment was similarly attacked on its arrival at this station in September 1865, but that visitation might be accounted for by the circumstances in which the corps was placed. The men were new to the country; they were unprovided with proper protection for the head, or clothing suitable to the climate, and the temperature was unusually high for the season of the year. Those influences being no longer in operation, it is a matter of some interest to arrive, if possible, at the causes producing the second outbreak, which was more severe in its character and more fatal in its progress. The 2nd Battalion 10th Regiment did not suffer, though occupying Barracks built close to, and on the same incline, as those allotted to the Cavalry, the rations, water supply, and conservancy did not differ, the amount of drill was not excessive in either Regiment, and both were placed as much in the same condition as the horse and foot soldier could well be. The Barracks for both arms were built in 1809; those occupied by the Cavalry seem superior to the others, having a much nearer approach to modern views on Barrack construction and sanitation generally. No Regiment ever landed under more favorable auspices; they

* A fourth fatal case occurred but does not appear in this column, as the death did not take place until the 3rd of August.

know they are quartered in the finest station in India, their physique is excellent. Strength 499, average age $25\frac{5}{12}$, service $6\frac{1}{12}$ years, and height 5 ft. 7 inches; they were judiciously selected as recruits, and carefully weeded before starting; they were 19 years on Home service, and had not been subjected to the hardships and decimation of the Crimean campaign.

In the absence of any accountable cause for this sudden burst of disease, and having in view the immunity enjoyed by the corps quartered in the immediate neighbourhood, it is perhaps reasonable to conclude, that the nature of the trooper's duty exposes him to influences which are not called into action where the infantry soldier is concerned. Both appear on parade at the same hour, though the cavalry soldier has to get up much earlier, and both leave it together, but there the analogy ceases. The infantry man is necessarily the more heated of the two, but when he is dismissed, he returns to his barrack room, and his work is over for the day. The mounted man has now a fresh duty to perform; he strips to clean his horse, and while doing so is exposed to the sun; perspiring from this exercise, the man naturally seeks to cool himself as soon as he is at liberty, and most probably sits in a draught; a chill succeeds and mischief is likely to follow in the liver or bowels. A cup of coffee and a biscuit before starting for the parade, and covered stables when they return, would no doubt tend to protect from disease men who in England groom their horses under cover, and seldom mount them until they have eaten their breakfasts. Still, we cannot lay all the blame to this cause, as up to the end of May the Regiment was remarkably healthy, having even fewer admissions than in England.

Admissions from January to May 1866.

Months.	Total Admitted.
January	20
February	24
March	34
April	33
May	46

I shall now enumerate all the circumstances likely to have a bearing on the case, and leave the matter to my readers.

1st.—Early morning parades, without any thing on his stomach except, perhaps, arrack saved from the last night's allowance.

2nd.—The sudden and frequent chills from the nature of his duties.

3rd.—The great scarcity and the impurity of the water; (it contained on an average 5 grains of organic matter per gallon, even after passing through the filters, as well as a large quantity of Chlorine.)

4th.—The imperfection of the filters themselves.

5th.—The unwholesome quality, from its leanness, of the ration-meat, there being no grass owing to the lateness of the monsoon.

6th.—The sickness usual in Bangalore at the commencement of the monsoon.

7th.—The Barrack with its close proximity to the Bazaar.

My own impression is, that conjointly with all the circumstances just mentioned, and to most of which the 2nd Battalion 10th Regiment was alike subject, there is a local cause in the Barracks themselves. The King's Dragoon Guards suffered from Cholera in one particular block near the main guard, which became healthy after removing some houses placed at right angles to it and intercepting the free perflation of air. Now, we have a troop (D) which gives a larger amount of admissions than any of the others, as shown below.

Months.	A.	B.	C.	D.	E.	G.	H.	Total.
January...........	3	2	3	4	4	1	3	20
February.........	5	4	2	8	...	3	2	24
March...............	4	4	3	8	7	6	2	34
April...............	5	9	4	4	5	3	3	33
May.................	3	9	3	16	10	...	5	46
June................	8	8	7	12	6	8	9	58
July................	6	10	11	12	11	6	5	61
August.............	6	3	7	5	9	4	4	38
September........	7	3	8	11	8	4	1	42
	47	52	48	80	60	35	34	356

I append extracts from the case book of the four fatal cases.

During the epidemic, on the suggestion of the Surgeon and with the approval of the Principal Medical Officer British Troops and Principal Medical Officer Mysore Division, the dysenteric cases were transferred from the Regimental Hospital to the new Cavalry Barracks on the Race Course; the change was most gratifying, the relapses, before so frequent, entirely ceased; the symptoms rapidly yielded to treatment; sleep, comfort, and spirits returned with quick convalescence. The treatment throughout consisted in the application of leeches over the course of the colon and around the anus; the gut too was occasionally washed out with milk and lime water; Ipecacuanha in full doses was exhibited in the form of infusion, and when the stomach was irritable the drug was thrown up the rectum.

CASE I.

Lance Corpl. R. C., aged 30. 11 years' service.

Disease.—Dysenteria Acuta.

Had been drinking before admission and exposing himself in the day time.

June 5th, 1866.—Admitted suffering from severe purging. Tongue furred.

8th.—Stools frequent, liquid and muddy-looking; cold clammy perspiration, and great prostration.

9th.—No improvement; exhaustion great; a choleraic countenance and great irritability of stomach.

11th.—Pulse 92; stools still frequent, muddy and fœtid; irritability of stomach and intense pain over the abdomen generally.

He gradually sank and died at 1 o'clock A.M. on the 13th.

Treatment.—Half drachm doses of Ipecacuanha, and enemas of the same if rejected by the stomach. Stimulants.

Post mortem 9½ hours after death.

Abdomen.—On opening the abdomen there was an escape of gas, and about 10 ounces of turbid serum and floating shreds of lymph were found in the cavity. Omentum loaded with fat, and vessels gorged, arborescent congestion of the small intestines. On tracing the colon the cæcum and ascend-

ing portion presented a deep red, and, in some parts, a sphacelated appearance with recent exudations gluing them to the peritoneum. The transverse colon was red and congested; the descending section and sigmoid flexure were almost gangrenous, and the peritoneum in a condition similar to that at the opposite side: mesentery highly congested. On taking out the hollow viscera and slitting them up, the stomach was filled with a quantity of dark muddy-looking fluid, exactly similar to what he had been passing: the mucous coat was pale. In tracing down the mucous coat of the intestines, two patches of inflammatory congestion were found, one at the origin of the jejunum, the other close to the ilio-cæcal valve. In the act of detaching the colon its wall gave way, and, when laid open, the whole of its mucous lining was found to be studded with round ulcers, averaging from the size of a bean to that of a pea. The folds were thickened and presented, in ridges, a bluish black sphacelated appearance, the intervening spaces being studded with the cupped-shaped ulcers. Some of these had penetrated so far as to be merely covered by the peritoneal coat.

Liver.—Natural in size and colour; four small abscesses were found on the under surface of the right lobe, the largest not exceeding a pea in size.

Remarks.—This case was most obscure from first to last; the patient passed neither blood nor mucus, and was free from tormina and tenesmus, yet the state of the great intestines presented, in a marked degree, the lesions considered to be characteristic of dysentery.

Case II.

Private E. R., aged 30. 8 years' service.

Disease.—Hepatitis Acuta.

A hard drinker.

June 6th, 1866.—Admitted with severe purging, straining, and griping; was discharged ten days before, having been treated for piles. The stools not dysenteric in character; has a jaundiced look, and complains of pain at the epigastrium and in the region of the liver.

Ordered Ipecacuanha and fomentations; leeches to side and around the anus; astringents subsequently prescribed.

7th.—Leeches repeated and salines ordered.

8th.—Leeches relieved the pain; he is feverish and bathed in perspiration; straining a good deal at stool with no result but the escape of gas.

Salines continued.

12th.—Pulse full and slow; stools frequent, thin, offensive and muddy; no blood or mucus; on manipulation no pain is felt over the surface of abdomen, except in one circumscribed spot about an inch above the crest of the ilium.

Vespere.—Skin cold and clammy; stools not so frequent.

15th.—Weaker, pulse just perceptible; abdomen tympanitic; complains of no pain or uneasiness. Bowels unmanageable, and constantly pouring forth fœtid, dark colored fluid; enemas rejected soon after their administration.

5 P. M.—Face flushed; pulse quicker and less compressible; skin hot and dry. No improvement.

17th.—No fever; pulse much fallen, very feeble; purging continuing and power over sphincter completely lost; great pain on pressure along the colon, especially in the right iliac region and over the sigmoid flexure.

Died at ½ past 4 o'clock P. M.

Post mortem appearances 17 hours after death.

Abdomen.—On opening the abdomen the liver was found extending two inches below the margin of the ribs, and pressing the stomach to the left side: the wall of abdomen glued to viscera. Omentum covered with pus and adhering by lymph to the intestines. On throwing back the right section of the abdominal wall, pus mixed with feculent matter welled up from the iliac fossa, and on further examination the whole of the great intestines was found to be rotten from gangrene, the contents having passed at different openings into the cavity of the abdomen. The stomach and greater part of the small intestines were healthy in structure.

Liver.—Enlarged and mottled on its convex surface, with a thin layer of lymph spread over its inferior aspect. Parenchyma pale; vessels congested.

Remarks.—In this case the liver was, to a certain extent,

engaged, but it is fair to conclude that the diseased action extended to the organ rather than had its origin in it, and might have been arrested by early bleeding from the arm.

Case III.

Private J. S., aged 41. 19 years' service.

A hard and constant drinker at Home and since he arrived in this country.

June 16*th*, 1866.—Admitted to-day with severe purging, griping and straining; passing small quantities of blood.

To have Castor oil and Tinct. Hyoscyami.

17*th*.—Purging urgent, stools dark and slimy.

To have one scruple of Ipecacuanha in infusion with Tinct. Opii. ʒss. and to be repeated at 3 P. M.

5 P.M.—Complains of pain around the margin of ribs.

To have 12 leeches applied and to take one grain of morphia at bed time. Castor oil in the morning.

18*th*.—Pulse small and weak; skin rather moist; has only been once at stool during the night, stools more natural in appearance; complains of no pain when the abdomen is examined.

To have one dose of Ipecacuanha in infusion.

20*th*.—Bowels still irritable; stools dysenteric; perspiration profuse and cold; pulse small and weak.

22*nd*.—Bowels quiet, and general symptoms much better; liver enlarged.

To have a dose of P. Jalap. Co. grs. xx.

27*th*.—Enlargement of right side and bulging.

28*th*.—He has now got congestion of both lungs, especially of the right; scarcely conscious.

July 4*th*.—No improvement; pulse better; sleeps continuously. Liver considerably enlarged, extending 3 inches at the least beyond the margin of ribs; complains of no pain; cough short and dry, but not troublesome. Tongue furred.

5*th*.—Tongue dry and furred; skin hot, dry and harsh; pulse rapid and hard; face flushed; very little cough; thirsty; otherwise comfortable.

6th.—Distinct fluctuation felt between the eighth and ninth ribs with slight œdema of the surface, dyspnœa urgent during the night; introduced a trocar and drew off about a pint of sero-sanguineous fluid, having a fleshy sickly odour, no relief given by the operation.

Noon.—Pulse fallen very much; skin hot but moist: seems comfortable.

Continue stimulants.

5 P.M.—Drew off about 14 ounces more of the fluid.

7th.—Wandering; but answers intelligibly when spoken to; pulse 126, soft, and compressible; passed his urine in bed; bowels not opened.

Continue stimulants.

6 P. M.—Removed trocar and drew off about 32 ounces of the same description of fluid mixed occasionally with pus; pulse feeble and not to be counted; countenance livid; short cough and urgent dyspnœa; constantly plied with stimulants. Abdomen tympanitic.

8th.—Slept about an hour during the night; sero-purulent matter has been discharging freely; pulse feeble and rapid, features sunk and livid.

Enemas of Beef tea with Tinct. Opii. twice.

Wine ad libitum.

5 P. M.—Great improvement to-night. Pulse 126, full and compressible. Wine to be now limited in amount; sero-purulent matter draining away in large quantities; drowsy but breathing lightly; vesicular murmur clear and distinct throughout the chest; skin moist; bowels not opened; passed his urine freely.

9th.—A restless night. Pulse 132, distinct but weak; skin clammy; his expression more natural. Abdomen flaccid; tongue brown, dry and cracked; no difficulty of breathing; matter oozing away constantly; passed his urine; bowels not opened.

To have a dose of Castor oil and Beef tea enemas.

10 P. M.—Dying.

10th.—Died at 4 A. M.

Post-mortem appearances 8 hours after death.

Abdomen.—Bowels distended with gas.

Liver.—Enlarged, both lobes extending about four inches beyond the margin of ribs and glued to abdominal walls by lymph, but easily separable. The surface of both studded with tubercles of a dirty yellow color, varying in size from a pea to a walnut. On raising the liver the right lobe was found to be adherent to the duodenum, mesentery, kidney, supra-renal capsule and colon, and on separating it from these attachments, a thin bloody fluid welled up. When the diaphragm was lifted from the upper surface of the gland, that muscle was found to have formed the roof of an abscess that had completely excavated the organ, and which was now filled with congealed blood.

Remarks.—The sudden termination to this case is no doubt to be attributed to the rupture of one or more of the many vessels found passing from side to side of the cavity.

CASE IV.

Private J. W., aged 28 years. 7 years' service.

Disease.—Dysenteria Acuta.

A very hard drinker at Home and since arrival.

July 19th, 1866.—Admitted yesterday with violent purging, the stools containing blood and mucus; leeched freely over the regions of the colon, and now free from pain or uneasiness in that region.

Ipecacuanha in full doses.

24th.—Stools frequent and dysenteric in character; great irritability of stomach.

25th.—Irritability of stomach still continues; very weak; stools frequent, but containing feculent matter.

To have Ipecacuanha by the rectum.

28th.—Weak and prostrate; stools frequent, but their character considerably improved.

1st August.—Worse; stools liquid, bloody and mixed with shreds; tongue dry, brown and furred; pulse full and quick; pain when his belly is manipulated.

To have Acetate of Lead injections twice a day.

Was able to keep a scruple of Ipecacuanha by the mouth.

2nd.—Slight improvement; profuse perspiration; stools frequent, liquid and bloody; tongue slightly moist and cleaning at the edges.

To have Ipecacuanha, two doses, by the mouth.

3rd.—Died at ½ past 1 o'clock A. M.

Post-mortem 11 hours after death.

Physical appearance.—Emaciation; rigidity of muscles; marks of treatment on abdomen (second attack within the year.)

Abdomen.—Liver enlarged and adherent to abdominal wall, intestines and omentum glued together. Inflammatory exudation along the ascending colon and slight contraction at commencement of sigmoid flexure; gangrene and obliteration of cæcum with extravasation of contents. The liver studded with numerous deposits of yellow tubercle in all stages of advancement, and varying in size from a mere speck to the dimensions of an egg. Gall bladder filled with a serous looking fluid. Inflammatory patches along the course of the small intestines.

Remarks.—In this case the dysenteric symptoms were well marked, but the hepatic complication did not manifest itself during the treatment of the case.

ART. XII.—*A Few Practical Remarks, and Reminiscences, bearing on Asiatic Cholera, and the best Prophylactics, as well as Antagonistic Means to resist the Poison, when it has invaded the system.* By Surgeon Major J. MACBETH, M. D., Surgeon, 16th Queen's Lancers.

I wish as a preliminary to state, I do not propose to offer any theory, or advocate any special mode of treatment, my principal object being to submit to the profession that there is, as yet, no specific form of practice which has afforded any decided proof of its being superior to, more effectual, or successful, than those therapeutic agents used and relied on five-and-twenty years ago. In my own treatment of the disease now, I have almost discarded Opium, and substituted Quinine.

Cholera, if I recollect, was first prominently noticed in Asia at the Sunderbunds in Bengal; my first recollections of it date so far back as 1835-36 in Edinburgh, where I was then a Medical and Humanity Student at the University; the disease first appeared, I think, in Sunderland amongst sailors. A number of Students, myself amongst them, placed our services at the disposal of different medicalmen who had charge of reception houses. There was a great panic, and all who could, left the city; the different remedial agents and plans attempted were very numerous, yet, the most general, and much the most firmly relied on was, *Calomel* and *Opium*, but, I saw transfusion employed, as also injections into the circulation, of various salts, and amongst other agents, Oxygen gas was introduced to the circulation, under an idea, that want of that gas in the blood was the real cause of the disease, its concomitant symptoms and fatal results. I give a list of some other plans of treatment, which have been published and advocated from time to time. It is too long for me to recollect the relative results of each separate mode, amongst others, common salt, perhaps, proved the least injurious, but I do recollect that all were speedily abandoned, one after another, while Calomel and Opium with Stimulants, were again resorted to.

LIST OF DIFFERENT KINDS OF TREATMENT OF CHOLI

1st. Stimulants! I think, save when administered the utmost care and watching, and only as an aid to l up the patient's strength and spirits, while under other t ment, it is the most mischievous and fatal of all plans; like whipping and spurring an exhausted and beaten h

2nd. It is a matter of grave regret to all thinking, cated, and experienced medical men, to see and read o reckless empiricism, patronised by men in the profes Surely it is as unwise, as it is clearly unjustifiable, t experiments on suffering humanity, without a theor any kind, either your own, or some one else's, yet it w appear there is no quackery too contemptible to be p nised by men occasionally.

3rd. The two last instances of lay empiricism have sp ly rung their own knell, I mean Strychnine and Camp

4th. Opium, as a principal agent in the treatme Cholera, I believe to be inadmissible and injurious, ducing as it almost always does, congestion, either o brain or some other organ.

5th. The cold douche, with friction, alternated by l and gentle stimulants, I have seen successful in som stances.

6th. It is little use telling us of any form of treat extending over days, in a disease which when fully dev ed proves fatal in four, six, and twelve hours.

7th. Half baking the patient in an oven, Sesquicarb of Ammonia as a stimulant.

8th. Carbonic Acid and Carbon in various forms.

9th. Sulphuric Acid.

10th. Eliminative treatment, particularly Castor oil, w according to my observation, simply eliminates the littl mina left for resisting the poison, and the patient d little sooner than he would have if left alone, or si nourished.

11th. The Astringent treatment, as Acetate of I Tannin, and other Astringents, quaintly designate some "the Corking-up treatment," has been tried but no satisfactory result.

12th. Ipecacuanha in full doses and in mild cases, is

to have given great temporary relief, and to have produced considerable reaction, which I quite believe and understand, whenever there is foreign or undigested matter in the stomach, whether bile, acid, fluids, or food ; every one has seen and many experienced, the immense relief obtained for the time by emetics. The Romans at their cœnal orgies, made this knowledge the means of gross indulgence.

13th.—Chlorodyne seems to be the most soothing and least injurious form of sedative narcotic, but it is only alleviating, not curative.

My next experience of Cholera was at Meerut, Bengal, where these were then quartered, European Artillery, one Cavalry and two Infantry Corps, when a terrible outbreak of Cholera occurred; the Regiments were the 1st Battalion H. M.'s 10th and 29th Regiments, and the 16th Queen's Lancers. The disease, as is its normal custom, assumed a most virulent and fatal form at first, the different hospitals quickly filled, and it proved fatal so very rapidly, in six or eight hours after admission, as to leave little time for the fair trial of any mode of treatment. This state of affairs, as is unfortunately too often the case, produced a panic, and a dread of going to Hospital, which still further exaggerated the evil. Indeed it is well known to all experienced in the treatment of this terrible disease, that unless you begin sufficiently early to defeat the advance-guard of the enemy, when he arrives in full force, your chances of successfully coping with him are most wofully diminished. During the epidemic alluded to, over three hundred Europeans fell victims before the disease had run its course, amongst others, "General Considine," whose brother served in this Presidency, his death was looked on as a national loss to the Army, he was seized, and died, all within 20 hours. This epidemic was in nearly every instance of a violently spasmodic type, accompanied by uncontrollable purging, and distressing vomiting, with burning thirst, and excessive irritability of stomach, the cramps coming on in paroxysms so severe as to elicit from strong men cries of agony. One very curious instance occurred in H. M. 29th Regiment, worthy of a passing notice; four men, each the comrade of the other, came to hospital as volunteer attendants all from the same room, and they all died one after the other, within 24 hours: the Surgeon determined to stop the volunteering; a hospital orderly

who had been in that situation 18 or 19 years, attended the fourth, he too was seized and died. Surgeon Taylor and myself had him placed in the sun, head protected, and stripped naked, one of the then modes of treatment, and frictions with Turpentine employed. The Surgeon was attacked the same night, and only just escaped with his life. The principal and most successful treatment,— if the term may be permitted under such miserable circumstances,—was Calomel and Opium, frictions, stimulant enemata, and moderate stimulation "per orem," with occasionally mustard sinapisms; but it is necessary to add, that in no small number of cases where the original disease had been fairly mastered and routed, the patients sank from what was then termed, "secondary fever," with metastasis to the brain, lungs, heart, liver, stomach, kidneys, or some vital organ,—the miserable result, violent congestions and death.

A curious instance of the inexplicable manner in which cholera seizes its victims, occurred in the 10th Hussars, the year before I was gazetted to that corps, in 1848, when it ran down the east side of one long barrack-room in Kirkee, attacking almost every man, and not one on the opposite side. Is Cholera contagious or not?

Since then, I have been amongst cholera patients in most parts of India, in the three Presidencies, in camp, in the field, and in quarters. I have seen a great variety of treatments adopted, with different results; but my experience has convinced me there is not one of them to be relied on. Where this as yet almost unknown disease attacks in its most virulent form, until the insidious poison,—as mercifully, always happens, after a time,—diminishes in intensity the percentage of deaths to attacked, is most terribly and discouragingly great, treat it as we may. But there is this to be said, any one who has once seen Asiatic cholera, properly so-called, whether a professional man or not, never *can* forget or *mistake* the disease for any other, nor any other for it. To illustrate my meaning, I shall offer a short description. The attack is nearly always more or less sudden at LAST, although it is certain what is designated premonitory Diarrhœa very frequently precedes it, which, if attended to forthwith, the disease may often be warded off; the earlier the notice, and that, by every half hour, the greater the chance and hope of success; still when it has become *developed cholera*, the symptoms present themselves very rapidly;

as diminished animal heat; the entire retrogression of the circulation from the surface; generally despairing, always painfully anxious, countenance; the pinched nose and features; the sunken eyes with surrounding dark areola; cold tongue; weak, nearly inaudible, stridulous voice, almost a whisper, the peculiar odour of the exudations from the pores of the skin, its bluish black tinge, cold, clammy feel, and, if one observes the odour, it is almost identical with that from the rice-water evacuations. There may be no cramps, comparatively little purging, and no vomiting, yet I have seen this form of the disease less amenable to treatment than much more painful and violent phases of it, with constant vomiting, purging, and violent cramps; the patient sinks, sinks, sinks, never rallies, and dies *poisoned*, his system refusing or unable to accept aid from any remedial agent. In such cases the most effectual means I ever saw adopted are, cold douches, then frictions, warmth, and the douche repeated, till the balance of the circulation becomes restored; then carefully administered nourishment, with gentle stimulation. Still even in this form no man who knows what cholera really is, *can*, I again say, mistake it for any other disease, nor any other disease for it. That ignorant men, professionals, have mistaken or effected to mistake Diarrhœa of different forms for Cholera, &c., I know; and that such attacks may degenerate into an ultimate attack of Cholera, if the poison be about. I also know that all such states of the body are predisposing to disease and render the individual affected liable to any prevailing form of malaria or other poison about. But I contend, the choleraic poison when received, requires a certain prepared state of the system to germinate, incubate, and exert its full and fatal effects: then, as in all poisoning, if the resisting powers of the system are greater than the poison, the patient will recover, *without treatment*, if the reverse, he *must* die, unless the powers of life be aided and supplemented by treatment. Surely this fact ought to render those who promulgate the non-interference doctrine ashamed of their pusillanimity and want of knowledge. There is nothing more depressing than fear, and when despair seizes a cholera patient he generally succumbs; therefore, in all epidemic attacks of cholera amongst troops, or any large bodies, one of the best and most effectual prophylactics is, (next to having all barracks four thousand feet above the sea's level, which I believe to be the only certain prophylactic) to take every means

for occupying the mind, and making the people cheerful. Of course perfect sewage, and the immediate burying of every excretion, the fumigation of the ward or room by Chlorides, Carbon, Condy's fluid, and other deodorants and disinfectants: all bedding or clothing to be thoroughly cleansed and disinfected, or, better still, *destroyed*: free perflation, good food and warm clothing (let it be all woollen); are essentially necessary as well. But when the disease has once fairly shown itself, there are no means half so effectual as a radical change of locality; the more open and free the new locality is from all surrounding obstructions to perfect perflation, as trees, buildings, &c., the better (an open plain or rising ground best of all). I have rarely seen this fail with reference to troops, and in many instances the disease has been totally arrested on the second or third day *when sufficient tent accommodation* or barrack rooms were obtainable. Such an instance occurred to me when the 74th Highlanders, on the eve of embarkation for England, were crowded into a confined, dirty, lately-occupied, and infected camp, either through the ignorance or carelessness of those concerned. Seven men were dead in nine hours. I went personally to the Commander-in-Chief, and got special permission through the Adjutant General to move the camp to Palaveram. The disease *ceased* from the time of removal, yet I was reprimanded by a Divisional Officer for leaving Guindy camp to accomplish this, and obtain efficient means for the treatment of the disease, which were not at my disposal in camp, and not sent till late the following afternoon from the Presidency Stores.

To escape Fevers, Insolation, and Cholera, build Barracks 4,000 feet above the sea's level; if on the plains, build on high open arches, to give perfect perflation. Have also sufficient superficial space, proper ventilation, a comfortable couch, and first-class food, with good bedding, abandoning the present boards and trestles (mere vermin houses). What is the reason that men marching, in tents, have occasionally, though moved daily, been almost decimated? Nothing is simpler than the reply;—the most unjustifiable manner in which they are crowded together on the march, lying on the bare ground, ten or twelve men in the present privates' tents. On a cold night they shut up every crevice, there is no attempt at ventilation from within; on the ground they receive damp or noxious vapours into the lungs, if present;

but at all events between the hours when they go to sleep and get up in the morning, they must be breathing over and over again, the carbonic acid and foul used-up air exhaled from the lungs of each other, evaporations from the skin, and from other sources not necessary to enumerate. But the evil does not end here, the men get up enervated, very little refreshed, and if there is any poisonous or malarious influence about, their systems are being carefully prepared to receive them, with the best prospect of producing the most deleterious effects. Again, this is not all!! the Khunnants! (Walls of Tents!!) saturated night after night with such gases and exudations from the skin, earth, and other sources, are not spread out to dry and become exposed to free currents of air, but tightly rolled up, placed in selleta bags, and carried on to the next camp, there again to be exposed to the same injurious influences. What then can a change of locality do against such odds? Hence the reason why disease accompanies, and is not left behind by camps;—and so it must be till men are raised above the level of the earth, and have proper superficial space, with free circulation of fresh and wholesome air underneath them to breathe, together with the means of escape for foul air and vapours provided for above them. On the present system if they escape cholera, or fever, the chances are the seeds of dysentery or rheumatism are received to germinate, incubate and produce baneful results at no distant period. If no better plan can be suggested, let there be at all events two sets of tents, one to be sent on, the other to remain, and be thoroughly dried after each march. Half a dozen deaths would actually cost more to the state than the additional expense necessary to carry this into effect.

I marched with a Regiment through, I believe, as malarious a jungle as any in this part of Southern India, without the occurrence of one case of fever or bowel complaint, and only one admission into Hospital, that, a case of cholera which a man contracted by drinking in spite of all warning from a sluggish stream impregnated with decaying vegetable matter; even he recovered. This satisfactory state of affairs continued the whole way between Ootacamund down by the Segoor Ghaut to Bellary, which result I attribute to the fact, that I obtained permission to carry a light charpoy for each man, having given all prophylactic doses of Quinine before marching each morning. The result of this experiment

was at all events encouraging, and if ventilation and proper superficial space were added, a still further success might be anticipated. It is right to add I had hill drinking water for the men carried as far as Ghoondlepet, in chatties on coolies' heads, and with the column in mussacks (leather bags), by no means a trifling adjunct to comfort and safety. On all marches where the slightest suspicion of the quality of the water is entertained, it ought to be filtered first, then boiled and cooled.

There might be some mode adopted of swinging hammocks without much additional weight. I suggest that a sort of hammock be firmly attached to the wall on either side of the tent with two battens run across to be fixed outside into the ground and supported on a cleft pole or standard, again supported by stays attached to a long pge or pegs outside. Hammocks so arranged could be strapped up to the walls during the day; this plan would also save the daily issue of straw: let Government offer a prize and they will speedily get good plans. The authorities might take warning; witness what happened to the 43rd marching between Bangalore and Madras, more recently on the march from Mhow. The former lost by cholera between the 20th and 31st 41 men, 5 women and 13 children. Five picked men of the 74th were marched through the Segoor and Bandipore jungle against my formal and official remonstrances, (the same the whole corps afterwards marched through without a case of fever). When they reached their destination, Bangalore, four of them were struck down by malarious fever, two narrowly escaping with life and shattered constitutions. However, I am digressing sadly, and fear this will prove a very desultory production; but, as it pretends to no originality, and can only be useful as a history of facts, results, and their causes elicited by long experience and careful observation, I trust any prolixity may be pardoned.

To return to cholera; since I have read of and seen the disease in India I have witnessed a great many different forms of treatment, seen some tried and read of a great many others; I will instance the cold "douche" which I have practised with both results,—success and failure, I regret, however, to state the latter predominating. Then Dr. Honigberger, the Lahore Durbar Surgeon, a German, and his quassin introduced into the system through the skin and tissues, by which means I have heard of many cures, but though I have witnessed it tried, never saw one, or indeed any effect at all result. Strychnine I have also seen tried in three instances, at

first apparently with marked success, but two out of the three ultimately died, and I confess I anticipated no more favourable result. Then there is Salt, Brandy and Salt, Camphor, Castor oil, Ipecacuanha, Red Pepper, Battley's Sedative, Warburg's drops, Omum water (a native remedy), and a host of other so-called specifics and nostrums. I have come to the following conclusions that, in most of them, where they are simply not injurious they may be tried with impunity, but they are individually and collectively totally unreliable and often *actually* injurious. I do think it is not a little presumptuous in laymen to write so imprudently, and recommend so confidently their pet remedies; surely if they would pause to reflect, they might be a little more modest, if they will please to consider that the time, brains, energy, and experience of professionally-educated gentlemen of the highest abilities in all countries have been devoted to study, experiment, and research, with a view to the elucidation of this great mystery, for the terms of their lives, and have as yet failed. Still let us not despair,—how long was variola a depopulating and devastating scourge of whole nations, but ultimately "Jenner" untied the knot. Let us hope we may yet have a *Cholera "Jenner."* At all events with such examples, as Jenner, Harvey (before whose time the circulation of blood was quite as great a mystery as cholera), Hunter and other benefactors of the human race, we may live, study, search, and hope. But what must be said to men in the profession who deliberately talk of, write about, and offer specific remedies, boldly stating they do not lose more than three or four per cent. They have either been treating some other disease, certainly not cholera, or they cannot be writing honestly and truthfully; for any one who has had extensive experience of cholera will tell you that every attack has been more or less influenced by one or other, often by *all* the following circumstances:—the virulence or otherwise of the poison, the locality, the climate, the season, the nature of shelter afforded the patients, the ventilation, food, clothing, altitude, (this "most important,") the constitution, habit of body, and temperament, and a variety of other causes more or less directly or indirectly affecting the disease and its result. I say, therefore, that any professional man bold enough, with so many biassing influences, to lay down any one or specific mode of treatment, is either deceiving himself, or attempting to deceive the public. As an example, during an outbreak of cholera in Bengal a

medical man foolishly, boastfully, and wrongfully wrote publicly to the effect, that any professional man who lost more than five per cent. of cholera *must* be *ignorant* of his profession, and unworthy to practice it; in less than a year after the promulgation of this rash, unjustifiable opinion, the Regiment he was in charge of was attacked, the loss was over 60 per cent. of those attacked. What you have todo then, in cholera, is, to be prepared for *every event*, you must treat symptoms as they occur, you must watch, modify, and change, or interrupt your "modus operandi," you will discover that the treatment you found successful in one form of the disease, will prove *actually* injurious in another; you *must watch*, I say, and treat each *symptom* as it manifests itself, to be *even useful*, and palliative, much more to be successful.

Calomel and Quinine in varied doses according to symptoms and circumstances are my great stand-by; given at first, as a rule, in full doses, afterwards continued in smaller ones, till an impression is made, or you have failed. Keep up your patient's strength and spirits; be very guarded in stimulating; effervescing wines, or drinks, iced, (be liberal with iced water) are the best and most grateful; if the surface is very cold, apply sinapisms, turpentine frictions, and moderate heat; give if necessary small stimulant enemata; *nourish* the patient with iced chicken broths, or beef-tea, in very small quantities, taken at short intervals; try to induce sleep,—applying ice to the nape of the neck, is a simple and good plan, or if you deem it prudent, give Morphine or Cannabis, also a little of the Chlorate of Potash in solution with Spt. Æth. Nitros., Potass. Nitras and Tinct. Hyocyami; watch for, and guard against metastasis to, and consequent congestion of, the several organs, and endeavour to ward it off, or when present, relieve the affected organs; the kidneys and bladder are nearly always more or less involved, suppression of urine may be almost laid down as a concomitant of cholera, and very generally when free micturition is restored, you may congratulate your patient and yourself on his safety.

There are a great many opinions about the best prophylaxis against attacks of cholera, and experience has proved beyond dispute that the greater and more efficient the precautions taken—more particularly bearing reference to free perflation, good sewage, wholesome water, warm clothing, a

sufficiency of nutriment—the milder will be the type of the disease, the shorter its duration, and the smaller the mortality. Many theories have been started as to the origin of cholera, ingenious, scientific, and probable, as also some very silly ones. Peculiar conditions of the atmosphere, a superfluity of electricity, a scarcity of ozone, and lately the presence of a peculiar bluish vapor, in India red, in Scinde yellow :—there may be more or less foundation for all, or any of them, but with reference to soldiers, amongst whom my experience chiefly lies, I would remark that the barracks for the men, their food and clothing, with proper attention of course to cleanliness,—" there is, in most barracks, an entire absence of plunge-baths, and very generally a most defective and insufficient lavatory system and sewage,"—if right, these are all that is necessary to insure the best state for effectual resistance, both individually and collectively, to an attack of the disease; but most unfortunately in a majority of instances, notwithstanding all that has been written and urged by medical men, those are not as they ought to be. What is even still more discouraging, an old and effete routine is perpetuated and persisted in. No one wishes to deny that the comfort and sanitation of the soldier has greatly improved of late years. I will illustrate what I mean with much diffidence, and with every feeling of respect to all constituted authorities; yet when I write at all, though deprecating the intention of offending any one, I always have written, and must continue to give my opinions freely and honestly.

It has been admitted on every hand, I believe denied by none :—

First, that the conservancy means at the disposal either of Divisional or Regimental authorities is woefully short and insufficient.

Second, that while it has been so fully established as a necessary and most important item in the sanitary necessity of buildings in the plains of Hindoostan to have the dormitories at all events, and, if possible, all the rooms inhabited by Europeans, as far from the surface of the earth, its exhalations and evaporations, &c., as practicable, to be effected only by building barracks on arches; while in this Presidency and this station (surely it would be an admirable opportunity to serve for experiment and

example in building the Race Course Hospital to erect it on arches, and with greater regard to properly divided and thoroughly seggregated wards) in barracks finished, in process of erection, and now scarcely begun, this has been entirely ignored. I also allude to the old cavalry barracks, where in consequence of the rough and unworkmanlike style in which the rooms have been paved,—in no manner can this be attributed to the Executive Engineer,—I am told the floors cannot be washed without saturating the earth below, through the open cracks, with moisture, which, in the course of time, when heated returns through the same channels as admitted the water, in the form of unwholesome vapours, gases, bad musty odours, disagreeable, if not unhealthy. Now the remedy for this is so simple and obvious, that it is to me, and many others, an inexplicable puzzle why it has not been corrected. Even three feet of the granite, so abundant in every direction round Bangalore, or of solid masonry below the flags, so as to permit a space to exist and a free current of air between the flags and the ground, would obviate, and do away with this most objectionable state of matters; yet even in the new Race Course Barracks the same fault has been perpetuated. Nothing can be more clearly proved than the obvious advantage of building barracks on arches. Room could easily be left for free perflation, while the spaces could be used as reading or store-rooms, work-shops, amusement places, &c.

Third, the diet of the soldier is by no means what it ought to be, either in quality or variety, nor what it is contemplated by Government orders to make it. Yet when Regimental executive officers in immediate surveillance represent the indifferent or often worse than indifferent quality of rations they are sure to offend some one, and are met by such remarks as, the season is a famine one, the contractor is losing, &c. I submit this is all wrong; the soldier ought to have his proper and nutritous rations, it is *his* right, and it is equally for the interest of *Government* that he should obtain it. If the contractor, in his love of speculation or greed of gain, makes a bad bargain, let *him suffer*, *not* the soldier; or if the Government wish to be liberal to the contractor, supplement the rate, or give fairly remunerative rates, and never accept such tenders as must manifestly result in loss and attempts to evade that by offering inferior rations. It is clear as light that if the ration laid down as necessary to

nourish and keep a soldier in good health is deficient in nutritive quality, he *cannot* be in good and robust health, or ready for any service he may be called on to perform. If the food he gets is deficient of nutritive quality, as I unhesitatingly assert it very often is, and if men thus fed are attacked by serious disease, they do not possess the stamina and power efficiently to resist it; the results are a certain amount of mortality, and a good deal of invaliding. It is therefore bad and false economy, more shortly waste of valuable, most difficultly replaceable, life, and, in actual fact, *extravagance,* the State suffering in finance, and the men not in that high state of efficiency they ought to be.

Fourth, I would have the canteen in every corps open under proper restrictions (easily provided for in every well regulated corps) the whole day. Now, a soldier knows he can only get malt or spirituous liquors at certain hours, and, as a rule, he goes there and drinks his allowance, whereas if he could go at any time, there are many men, on many days, who would not go at all; at all events, avoid the poisonous mixtures they resort to the bazaars for, under the existing system. With further reference to canteens, there is one other argument in favor of allowing them to be open, which though a negative one, is nevertheless practically of much importance. If a soldier in his canteen gets drunk, becomes noisy, or gets stupid, he is at once removed, cared for, and properly looked to. If outside in the bazaars, he most probably lies down, or walks about in the sun, and sows the seeds of fatal disease. The canteen ought to be a comfortable, well-lighted lounge for the soldier, where he can have his glass of beer or grog, and a gossip with his comrades. The plan of having grog-tubs, as on board-ships, and distinct hours in barracks, I know often results in young soldiers, nay even boys, drinking their allowance, when it is positively distasteful to them, because they think it would look unmanly not to take it. One other suggestion, let the Government give up supplying malt liquor, put a contract up to auction, let there be kilderkins, hogsheads and half hogsheads so as better to regulate the daily quantity on tap.

Fifth, one of the most prominent defects in the present plan of constructing barracks is the sacrificing everything for height. No greater error can be imagined; it is a positive disadvantage to have rooms above a moderate height, it

produces undesirable, unsanitary draughts, and obviously does away with that great desideratum in all barrack-rooms, a good large superficial space:—witness Trimulgherry barracks at Secunderabad, where both the Royals and 74th Highlanders and 12th Lancers suffered from a severe and fatal form of dysentery, generally referred to that very cause, while the magnificent and imposing-looking Hospital where they were treated, was in those days only a succession of long open corridors, without an attempt at segregation. There is want of segregation in the Race Course Barracks here, all the rooms are too large and too lofty. I am of opinion that not more than ten or twelve men ought to occupy any one compartment; all should be well and sufficiently lighted, and not, as now, giving the rooms an aspect of tombs or subterranean passages; the men ought to be able to read and amuse themselves at home, they would then be satisfied to stay there, become more intimate, and spend their leisure hours in comfortable, cheerful, and well-lighted rooms; this would do away with the desire and habit of going nightly to the bazaars in search of such pernicious indulgences, I cannot call them enjoyments, as ultimately ruin them physically and morally.

Such are my humble views as to the best prophylactic means against not only Cholera but all other severe and fatal epidemics. The eccentricities of the progress of cholera at different times no one has yet been able to approach a solution of. I have myself seen the disease take nearly every man along one side of a room, and not touch one on the opposite side, as in the instance mentioned of the 10th Hussars.

I have again to apologize for the very desultory and somewhat unconnected form of this paper, and to repeat that there is not the slightest originality claimed for any paragraph, it is a mere epitome of facts gathered from time to time, with the deductions they have suggested to me as legitimate. I write in the hope that some abler man will take the matter up, but solicit the attention of Government to the amelioration of some matters requiring nothing but proper attention and system regarding the defects set forth by me—their existence or otherwise calls for investigation. To substantiate the veracity and correctness of the statements I have ventured to make, will afford me much pleasure if called on at any time.

I may not conclude this paper without expressing great regret, because, while it is admitted on all hands that the suggestions offered by Medical Officers from time to time are not only most advisable, but if carried out would add to the comfort, efficiency, and content of all concerned, indeed, in most instances are absolute sanitary necessities, and effected would produce a large saving to the State, it is most discouraging to zealous men who bring defects prominently under notice, not unfrequently to the prejudice of their own private interests, because they are obliged to expose deficiencies the existence of which are naturally not agreeable to those who are vested with the power to remedy them, though admitted by the authorities, by Commissioners, and all at home and abroad, are frequently dismissed, with such admission, and, perhaps, a recommendation to remove the defects complained of, still year after year they remain pretty much as heretofore, and all seems to go by default.

I read in the *Madras Times* of the 3rd October 1866, an able leading article by the Editor, containing a notice of Dr. Goldie Scott's Report on the employment of soldiers out of doors on the Himalayas, which is only confirmatory of what occurred in the case of the 74th Highlanders on the Neilgherries, when employed in building the Wellington Barracks, and scarping and levelling the ground in their vicinity, the results of which, as to their sanitary condition, will be found recorded in my special report on "Hills and Plains," republished in the *Madras Quarterly Journal of Medical Science*, vol. ix. page 81, taken from the quarterly report concerning that corps, in the period embraced between the 1st October and 31st December 1854.

The Sanitary Commission at home expressed their entire concurrence with, and confidence in, the statements contained in the report under notice, and the deductions drawn from the statements and statistical tables contained in it, strongly recommending that they should be carried out and form a basis for extending the means of accommodation for European soldiers, at such altitudes as would ensure similar sanitary advantages to those enjoyed by the 74th Highlanders when stationed at Wellington on the Neilgherries. But in this Presidency matters seem to a certain extent to have retrograded, inasmuch as the only existing barrack has been converted into a Convalescent Depôt, while so far back as 1855, a building for this purpose, in addition to

barracks for a Regiment, was sanctioned, and part of the foundations actually laid cn an admirable site to the right of the road leading from Wellington to Ootacamund from the South. In Bengal and the Punjab much has been done to increase barrack accommodation on the Himalayas. May I ask then why nothing is being done in the Madras Presidency? where the facilities are much greater, the sea-board close, and railways extending almost to the foot of the Coonoor Ghat. There are many excellent sites in different situations on the Neilgherries, one about two miles from Wellington on the left and right of the road leading to Kotagherry, where barrack accommodation for even a Cavalry Regiment, with their horses, might be constructed; and why not! a little judicious levelling would render even a drill ground feasible and tolerably good. If soldiers saw their comfort, safety, health, and convenience more considered, their pensions increased after their full period of service, many more limited service men, by far the most valuable class of soldiers, would take on again, and look on such a prospect as much better worth re-engaging for than any increase of bounty. I also feel confident it would induce a better class of men to enlist, and diminish the difficulties of recruiting. The return of such men after their discharge to their native places with the recollections of having been well and considerately treated while serving, and after their discharge, retiring with a sufficient pension to live respectably, would do more towards efficiently recruiting the army than dozens of recruiting serjeants.

ART. XIII.—*Thoughts on the Etiology of Cholera.* By R. WILKINS, Second Apothecary, Demonstrator of Anatomy, and Curator of the Museum of the Medical College, Madras.

Read before the Madras Apothecaries' Society.

IT scarcely needs mention that Cholera, according to current opinion, is due to blood-poisoning. We know nothing of the nature of the poison which induces it, yet the notion is gaining ground daily. By several the idea of poison is regarded as a matter of fact. Though I am far from denying the possibility of the disease being occasioned by this means, I cannot, in the meantime, refrain from remarking that many of the arguments which are over and over again being urged to establish this theory appear to me not such as to warrant reliance on it. Many, even Medical men, seem unwilling to pin their faith to this particular idea; they either attribute the disease to other causes or they aver that its cause is a mystery beyond human ken.

The cause of cholera which I am disposed to regard as correct is *altered electric condition of the atmosphere*, rather I should say, a negative electric state of the air, and negative in reference to the electric condition of the body; this altered condition of atmosphere operating upon bodies predisposed by dyspepsia, gastric or intestinal irritation, &c., is the exciting cause of cholera in some, and the predisposing cause in others who become liable to the attack later in the season, if the state of the atmosphere should continue as above stated.

The human body, like other bodies, whether organic or mineral, contains a certain amount of electricity, in a sense fixed, but which may possibly vary within certain, though not definite limits, without effecting any manifest alterations in its constitution: it pervades every tissue and the blood is charged with it. This electricity has several important purposes to fulfil in the economy, many of which are known and recognized, and with regard to that which is contained in the circulating fluid, apart from the share it may take in other operations carried on in the living organism, it serves also in my opinion to keep the blood in its normal liquid condition, a fact which will be rendered evident by a care-

ful study of the phenomena connected with the process of coagulation: it also, I believe, serves in a great measure to keep up polarity of muscle, a state implying, according to Dr. Radcliffe, muscular relaxation. It moreover is in conjunction with the force generated by the nervous system (the *vis nervosa*) which force, it must be remembered, is considered by some Physiologists as probably identical with electric fluid;* that principle to which is due the vigour of the animal constitution.

Its source is the atmosphere and the physical and chemical changes taking place in the body. My. belief is that during the process of respiration, the blood, on being subjected to the action of the air, is not only simply oxygenated, but it undergoes a far more important change, namely, that of electrization. The presence of electricity in the blood has been proved and it has been found that arterial blood is positive in its relation to venous blood. Anent the change effected in the air by the respiratory process, Mr. Orton writes, "Mr. Reid has proved by experiment that the air becomes changed from the positive to the negative state of electricity by respiration, and Volta has confirmed this inference. The general principle of the absorption of electricity by the blood in its change from venous to arterial blood in the lungs is likewise assumed by various respectable authors." He continues, "Nature does nothing in vain; there is no substance in the whole animal economy with which we are acquainted that does not answer some important end, and we cannot, for an instant, suppose that *the most active and momentous principle in nature can thus be commonly taken into the system to remain in it inactive and useless.*† It may then be strictly inferred that the supply of electricity is necessary to the animal economy, and that the diminution and suppression of it may produce disease or death."

When the air by the operation of any cause is being deprived of its electricity,—rendered minus, in other words,—an action having for its object the attainment of its electrical equilibrium is simultaneously set up; every object within the sphere of its influence, if plus at the time, parts with

* Nerve force and electricity are identical. Dr. W. Phillip. Phil. Trans. for 1815, pp. 5 to 90. The late eminent British Surgeon John Abernethy was of the same opinion.

† The italics are mine.—R. W.

some of its electricity, and man while he gives his quotum towards that end receives no equivalent from it to sustain the vitality of his blood, at least so long as the cause which is influencing the condition of the air is in operation.

I regard electricity as a very important element in the constitution of the air, and therefore air not properly charged with it is ill-fitted for man's purpose. The atmosphere is the principal source from which blood derives its electricity, and if that element is wanting in this vivifying principle, the blood suffers impairment in its quality, and disease results.

If the proposition be admitted that the blood owes its fluidity to electricity, we can easily understand when deprived of it what must result as a consequence. In the first place, we shall have coagulation of the blood in proportion to the quantity of electricity lost, and consequent stagnation in the venous system. The symptoms characteristic of cholera occur from this altered physiological condition of the blood,—for example, irritability of the stomach from congestion of the organ, and diarrhœa from intestinal congestion; the spasms occur from disturbed polarity of muscle. When no symptoms, such as vomiting and diarrhœa, precede a fatal termination of this disease, it is very probable that the withdrawal of the electric fluid from the blood has not only been sudden, but of some considerable extent; a case like this might fairly be regarded as akin to one in which death has resulted from a stroke of lightning.

We are familiar with the fact that the blood in cholera is in a tar-like, imperfectly coagulated state. Not long ago, I remember reading a remark in one of the Medical Journals to the effect that, in a certain case of cholera, the blood was found to be in a fluid state. This, medical men will admit, is seldom noticed. It was, in all probability, owing to the blood having lost a considerable quantity of its electric fluid. I am aware also that there is a discrepancy of opinion as regards the state of the blood in the bodies of those who have been killed by lightning; some believing it to be fluid, while others state that they have found it in a condition the very reverse of this. I am disposed to think that the condition of the blood may be either solid or fluid, and that the difference is exclusively due to the character of the shock,—the fluid condition indicating a severe shock, and that the blood is in this state from being about to take on putrefactive change from hav-

ing been deprived of a larger quantity of the electric fluid than was necessary to solidify it. I believe these shocks rob the body, not only of its free electricity, but also to some extent of that which is considered essential for the purpose of keeping together the various atoms of the different constituent parts of the body, and understood as chemical affinity.

It is a fact that when the air as regards its electricity is either negative or nil, dead organic matters putrefy rapidly.

This is the sum and substance of my view of the cause and nature of cholera, to corroborate which I will now refer to certain facts and observations connected with the disease, and endeavour to explain them. The explanation will as far as possible embrace acknowledged facts and be based upon the idea just expressed.

First of all, as regards the tendency of the disease to travel westward. Several writers on cholera draw attention to this fact. The peculiarity is observed not only in respect to the line of direction traversed by this disease, but by other pestilential diseases also.

No one, to the best of my recollection, has as yet offered any explanation of this very remarkable phenomenon. It is difficult, nay impossible, to reconcile the fact with the cherished idea of the disease being due to poison. My impression is that the motion of the magnetic equator from east to west influences this tendency. There are no reasons for supposing that the direction of winds have aught to do with this line of transmission of the epidemic influence. It has progressed in this direction under the most adverse circumstances, a fact which militates much against the idea of a material poison.

Secondly:—The setting in of the disease, as a rule, after mid-night, about two o'clock or thereabouts. This is owing in all probability to the great diminution in the electric tension of the air which takes place at this time. From electrical readings taken at the Kew Observatory during upwards of three years, it was ascertained that in summer the principal minimum took place at 2 A. M., and in the winter at 4 A.M. Whether electrical observations are made in India seems doubtful, but the probability is that the minima, considering the circumstance under which they occur, take place here also at the same time.

Thirdly :—Vigour of body predisposes to cholera. This is a fact which nobody having any experience of the disease will deny. We have statistical proofs also that this is the case. Dr. Balfour, (now Inspector General of Hospitals of the Hyderabad Subsidiary Force,) in his statistics of Cholera, remarks :—" One race of men is more susceptible to the influence of the cholera agent than another. The European soldiers, for instance, are much more frequently attacked with it than their native comrades, and the Madras Native troops have lost more of their strength than the Native soldiers either of Bengal or Bombay."

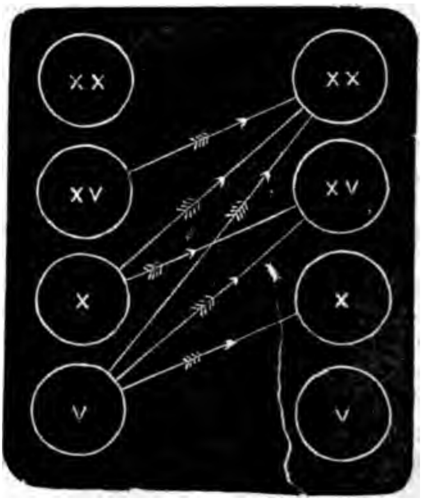
The General Board of Health in their report of the epidemic cholera of 1848-49, state :—" A very large proportion of its victims were in the prime of life. Out of 2,322 attacks and 1,058 deaths occurring at Glasgow in which the ages were carefully taken, the numbers attacked be tween 20 and 40 (1,148) were more than double those up to 20; between 20 and 50 the numbers more than doubled those who suffered in all the other periods of life put together." And from Mr. Thom's report they quote :—" It seems as if the disease had travelled along the front ranks of these, (alluding to the tallest and strongest men) indeed throughout the regiment it was the most powerful, muscular and robust men, that most speedily and generally fell victims to the malady. Any one who ever saw the splendid men in our flank companies, and will inspect table F will quickly appreciate the truth of this. It was indeed a sight never to be forgotten to behold the powerful frames of the finest men of a fine corps, who had on the evening parade as if at once stricken down and striving with the last efforts of gigantic strength to resist a death-call that would not be refused."

There is seemingly no explanation on record why this difference in susceptibility exists. If we hold to the poison theory we must abandon the explanation. The bare assertion that the European, a decidedly more vigorous individual, is more prone to be attacked than the native, wont be regarded as satisfactory, and what would appear less so, a statement to the effect that the vigorous man is more easily affected by poison, for we are in the habit of associating debilitated constitutions with proneness to be influenced by septic poisons. The explanation I have to offer is simply this. The electric force in the constitution

of a vigorous man, a European for instance, is positive, and in keeping with his constitution. When compared with one less so, the vigorous man therefore is not only the first to be deprived of his electricity, when the electric state of the air is either negative or nil, but setting this aside, the first also to suffer alteration in the character of his blood from the change that has taken place in the air, unless he is protected.

Judging from the character of the diet used, the Madras sepoy must be a more vigorous man than the Bengalee or Bombay sepoy, and he is acknowledged to be so, hence his proneness, next to the European, to attacks of cholera.

Dr. Balfour remarks also,—"That the older soldiers have been less frequently attacked than the younger men." This immunity enjoyed by those advanced in age who are, it will be admitted, generally wanting in vigour is observed among all classes of people. It is seldom, comparatively speaking, that we hear of an old man or woman being attacked with the disease. The diagram given below is intended to elucidate this peculiarity. The circles on the left numbered respectively 20, 15, 10, and 5 represent the different electric states of the air; the one marked 20 indicates a high electric condition; those on the opposite side marked 20, 15, 10 and 5 exhibit the degrees of constitutional vigour, 20 being the highest, and the lines show under what electrical states of the air the different constitutions are affected.



The proportion of cases among Europeans would be very much higher were it not for the fact that they are, as a rule, better clad, better housed, and, above all, have the good sense to avoid subjecting themselves, when the disease is rife, to the influence of the ordinary exciting causes, such, for example, as exposure to night air, use of purgatives and the use of food of a kind and quality likely to derange the functions of the digestive organs. And, with regard to the natives, I may observe it is a fortunate circumstance that they are, from the character of their constitution, less liable to attacks of the disease: were it otherwise, the mortality among them would be truly appalling, and I say so because I am aware that they concern themselves very little about measures calculated to ward off the disease, and when actually attacked, seek for remedies only when it is too late.

From observations made during several outbreaks of the disease, my conviction is that a high proportion of the cases has been induced by the use of powerful purgatives, and of the deaths a still higher proportion has been owing to sheer neglect of the early use of the ordinary and well-known remedies.

Fourthly:—*State of the weather before an epidemic of cholera.* Another circumstance which gives material support to the view I have advanced is the state of the weather which usually precedes an outbreak of cholera, and which even continues during its prevalence. This state is characterized by an overcast sky, haziness of the atmosphere, probably from extreme humidity, and close and sultry nights, or by the presence in the neighbourhood of athunder cloud with a strong wind from the eastward or southward, a condition of the weather which indicates a negatively electric state of the air. Writers on epidemics notice these peculiarities in the weather and some of them lay considerable stress on them. Mr. William Leithead, some time back Secretary to the London Electrical Society, remarks, in reference to observations on the subject by several authors, "It is evident that on the occurrence of thunder storms, large portions of the atmosphere possess less than their natural share of electric fluid, and we find that many of the most destructive attacks of the epidemic have been attended with violent thunder storms, and that its ravages have ceased after the restoration of the electrical equilibrium."

In the *Lancet* a short time ago the following article appeared corroborating strongly the views advanced in this

paper as regards the induction of the disease by altered electric state of the air.

"Electric origin of cholera.—We propose to call attention to the relation between cholera and electricity as shown during the recent epidemic. This relation appears so marked, that it must be considered some thing more than a curiosity or coincidence.

"We subjoin a table compiled from the reports of the Registrar General showing the number of cases of cholera in a series of successive weeks, with electrical condition of the atmosphere during the same periods.

"*September* 23*rd*.—Seven cases. None shown, except on two occasions, one positive, the other negative.

"*September* 30*th*.—Four cases. None shown, except on two occasions, both positive.

"*October* 7*th*.—Three cases; the same, but the duration longer.

"*October* 21*st*.—Forty-five cases. None shown, except positive on one occasion, and negative on the other.

"*October* 28*th*.—Thirty-four cases; nothing shown.

"*November* 4*th*.—Sixty-five cases; nothing shown, except positive once.

"*November* 11*th*.—Sixty-two cases; nothing shown.

"*November* 18*th*.—Fifty-four cases; nothing shown.

"*November* 25*th*.—Thirty-four cases; nothing shown.

"*December* 2*nd*.—Twenty cases; nothing shown.

"*December* 9*th*.—Twenty-one cases; nothing shown, except negative once.

"A careful examination of antecedent periods and seasons show this remarkable absence of electric phenomena to be an almost unique occurrence. Last year during the prevalence of the influenza, though electricty was 'not shown' in several reports, still its absence was not nearly to the same extent as on this occasion."

Dr. Pickford remarks, "The prevalence of epidemic or pestilential disease has been associated with the absence or deficiency of positive electricity in the atmosphere, and the mortality has been found to be in the inverse ratio of the amount of positive electricity with which the air is charged.

"This was especially remarked during the last visitation of the Asiatic cholera."

I will here notice one fact which might be looked upon by medical men as conclusive against the doctrine advocated in this paper, namely, that, during the prevalence of cholera, observations which were made in certain places showed that magnets had either lost none of their power or were only seldom disturbed, an event which tends to the belief that there was also no electrical disturbance of the air at the time.

Though it would be perfectly rational to suppose that a change in the magnetism of the earth, however trivial that may be, will affect the electrical condition of the air, yet I think it will be conceded that it is not every magnetic change there which is indicated by a magnet, that in short we may have magnetic alteration in the earth and consequent change in the electricity of the air, and the needle showing no variation either in dip, declination, or intensity; even the most sensitive electrometers fail to reveal changes in the electric state of the air, unless these are considerable.

Another circumstance connected with cholera, one which is regarded as favoring the view of its origin by poison, and of the transmission of the *materies morbi* from one locality to another, is the occurrence of the disease sometimes in succession, in localities distinct from one another, and its absence in others in the neighbourhood, which may be subsequently attacked. The facts expressed in the following passage from Mr. Leithead's work, I think satisfactorily combats the idea.

"It is evident that a large portion of electrified air will exert an inductive influence on another portion: and the latter, again, will affect a more remote part, so that the atmosphere above a certain tract of country may be positive, whilst at the distance of a few miles it will be negative; and between these two opposite electrified portions, or rather at some central point, we shall have a plane of neutrality as above explained.

"Again, it is necessary to remark that all, or at least many bodies on the earth's surface, upon which the air in a certain electrical state impinges, will be subject, in like manner, to the inductive influence, becoming either positive or negative, according to their various natures as electrics or conductors. The effect of this, again, will be a reaction upon the air in the neighbourhood of those bodies, reinducing a positive or negative condition, accordingly as adventitious

circumstances favor the one result or the other. Thus, eve a small apartment, one individual may be exposed to the fluence of a positive, whilst another at the same moment n be exposed to a negative, atmosphere, and we shall now readily see how it can happen that the inhabitants of town or village may be free from the ravages of an epide disease, whilst those of other neighbouring towns or villa are suffering more or less from the effects of the visitati Why, even in the same town, some particular localities will more free from the attacks of disease than others, and w again, a certain tract of country, having for a brief per escaped, should still be visited by the pestilence after perh the lapse of a few weeks, the neighbouring parts be then as free from the epidemic as that tract was at the ti of its raging in parts around it."

The facts here enumerated go far to explain even why i that removal of a person ailing from constitutional dise (cholera not excepted), from one locality to another, is of followed by results salutary in the extreme.

I am so thoroughly convinced of the utility of the practi of removing patients ailing from certain diseases, chol and fever in particular, from the apartment or locality which they were attacked to even a little distance away fr it, that whenever an opportunity offers and it is feasible do so, I should (provided of course the management of t cases were entrusted to me) urge the measure upon the p ties concerned.

Influence of certain mental emotions. It is a common o servation that during the prevalence of cholera, certain me tal emotions, fear in particular, induce the disease. I ha reason to believe there is much truth in this, and the fa seems to be owing to circumstances, such as these, operi ing conjointly with the altered electric condition of the a mosphere, in reducing the electric force of the individual a placing him in a condition adverse to its generation in l system.

From what I have advanced regarding the cause of chole it might be inferred that I ignore the influence of exhalatio from putrefactive decay of organic matters in the producti of the disease. But this is not the case, for although I am p pared to assign reasons which lead me to suppose that the exhalations do not constitute the cause of Cholera, I a

willing to admit that they act prejudicially on the health; and they do so either by altering in a measure the composition of the blood, or by mixing with the air virtually diminish the volume of that element taken into the lungs during each inspiratory act, and so interfere with the thorough aëration of the blood—aëration in the sense I would wish it to be understood, namely, charged with both oxygen and electric fluid. Effluvia of themselves, I believe, do not give rise to cholera. How repeatedly has the remark been made to the effect that stinks abound and notwithstanding the public health is nct interfered with. In the first volume of the *Madras Quarterly Journal*, at page 499, the Editor writes, "It is curious however to remark that during the months of March, April and May, when the stench from the drains was almost unbearable, there was no cholera or epidemic diarrhœa."

We have it on record that in London during the summer of 1858, when the heat was great and the stench intense, diarrhœa was not nearly so fatal as it was usually observed to be. I could cite many more instances to the same effect, if I chose, but it is not my intention to lengthen this paper unnecessarily.

The large majority of those cases which observers are led to regard as owing in a great measure to the poisonous emanations from the sick, and from the bed clothes used by them, and from the evacuations, &c., occur, I would say, not from such causes, but from the individuals being subjected to a condition of the atmosphere similar to that which has induced the disease in the person to whom is attributed its spread.

Upon the question whether cholera is due to poison, I have a few remarks to make.

I have already expressed my belief that electrical change in the air produces the disease, and this it can do without the intervention of poison of any kind. Poisons whether detectable or not have very little to do in the causation of cholera. When the paramount cause is present these may simply aid.

The theory of poison seems unphilosophical; to say the least it is not based on very stable arguments. I have set it aside for the following reasons:—

We know nothing of the nature of the poison. We have no proof of its existence: attributing the disease therefore to this cause is an assumption, not a fact.

Because the disease has a decided preference for you people, and particularly those in robust health. It can be said with any show of reason that these are more eas influenced by poison than others.

It might be urged that the poorer classes, and, necessari the less vigorous and robust are more liable to be attack and not those who are in the height of health and vigor, a I would not be surprised if it were, for I know it is an opini believed in by many and even by professional men, but t statement needs confirmation. There are not only no stat tics to prove this, but we have reliable testimony to t contrary. The Board of Health remark that "abunda evidence has refuted the common notion that cholera is par cularly prevalent and fatal among the extremely poor. T chief sufferers in the recent epidemic (of 1848-49) were n paupers, but independent labourers, artizans and the low grade of shop-keepers, classes generally not destitute of fo and clothing."

Because the tendency of the disease is to travel in a weste ly direction, despite even circumstances the most adverse—a suming the poison to be material. Most medical men, I thin believe it to be so. They aver its subjection to the laws gravity, and, on this idea they base their explanation of t fact, that elevated localities are comparatively free fro cholera, while in low marshy countries it prevails to son extent. If the poison were material, contrary winds mu materially check the westerly progress of the disease. W have evidence that they exercise no influence over it.

Because satisfactory results usually follow the early exh bition of remedies not considered specifics. If the disea were due to poison, why enforce the strict observan of the rule to make efforts to arrest it at the very com mencement?—a measure like this is calculated to preve the elimination of the poison. We prescribe remedies earl because we know that this is the safest practice. There is n poison in the system; we have therefore no need to conce ourselves about its elimination. When the disease is check by early treatment, do we find that the system has ma efforts to eliminate the poison, or are we to regard t remedies we have used in the light of antidotes?

Another reason is the great success that has attended t adoption of certain therapeutic means in the prevention a

cure of this disease. For instance, the use of a flannel or woollen belly-band, particularly during the night, is known to be effectual in warding off an attack. Its use, I believe, is insisted upon in the European army in this country, and the results noticed up to the present time are such as will, I am sure, lead eventually to its being universally adopted. Flannel has this good effect, simply because it is a non-conductor of electricity. I am inclined to think it would serve the purpose better were it made to cover a greater portion of the body.

Now with regard to the remedies of which their internal use in cholera has been extolled above all others by orthodox practitioners, I allude to the oil of turpentine, castor oil, spirits, sulphur and certain metallic salts, &c. I believe when absorbed into the system, the oils act as non-conductors; they prevent the further escape of electricity from the blood; alcohol increases the vital activity of the body, in other words, by the influence which it exercises upon the nervous system, it causes it to generate force which probably ere long will come to be looked upon as electric force. Sulphur is an electric. The metallic salts act chiefly by stimulating the various secreting organs to action and causing chemical changes which develop electricity. They also generate electricity themselves by the chemical changes they undergo in the body. This electricity, though gradually developed, is appropriated by the blood, and so results the restoration of the vital condition of that fluid, and recovery from a diseased to a healthy state.

Again, the character of the epidemic now prevailing considering in a hygienic point of view that many of the towns and cities under British rule in Southern India and elsewhere have, since the institution of sanitary commissions, been greatly improved, particularly of late, does not seem to me to harmonize with the received opinion as to the cause of cholera. For the present epidemic is characterized, not only by unusual severity of symptoms, rapidly terminating in collapse, but also by a persistence which has been observed not to be the case with epidemics which have occurred previously, at least for some years back, during which it is notorious that efforts such as those now made to remove sources of malaria were unknown, for the simple reason that the public then did not appreciate sanitary interference as they do at present.

Supposing it were a fact that cholera was due to poison,

the observance of quarantine regulations ought to be always attended with some amount of success. Have we proofs that this is the case? To my knowledge and within the last few years the remark has been more than once made purporting the inutility of such a step in the prevention of the spread of the disease. And, again, what results I ask have followed the vigorous enforcement of measures such as those usually carried out by municipal authorities during an outbreak of it, and believed to be calculated to hold it in check? Can we conscientiously speak in positive terms of the value of these? Does it follow as a matter of course that when an outbreak has declined after the adoption of such measures that this event has been owing to any such sanitary interference. Though it is not my intention to deprecate altogether such measures, I hold, notwithstanding, that an epidemic will continue in a locality for a certain period in spite of human efforts to arrest its progress.

The occurrence of the disease rather more frequently in towns and cities bordering rivers :—my opinion is that this is owing in a great measure to an altered state of the atmosphere as regards its electricity. Few will deny, after a little reflection, that at times this must take place to a great degree in localities so situated, particularly in the tropics, considering how variable must be the extent and degree of evaporation from the surface of their waters, and consequently the condition of the air as to humidity, temperature, &c.

Professor Locke noticed on one occasion an increase in the dip and intensity of the magnetic needle upon crossing the Ohio River, and Dr. Houghton an American Geologist, found that a deflection frequently took place as he approached a large body of water.

These observations were in no way connected with any medical investigation.

It has often been noticed, indeed it seems to be the rule, that, while the disease is making its ravages along one bank of a river, the people on the opposite bank are perfectly free from it, and it is a common observation also that troops with cholera among them cease to have fresh cases soon after crossing a river, or take the disease if they had not it previously, showing that there must be some difference in the atmosphere on both sides.

The fact I have here attempted to explain is attributed

by many to a contamination of the river by sewage, and consequently also the air in its neighbourhood. Were it so, how is the fact that the disease is often confined to one bank of a river to be accounted for. Could the poison not travel across as along a river ? and why it is that though the people on both sides of the river are making use of its water, those on one bank are free from the disease, whilst among those on the opposite one it is prevailing.

A word or two now on the subject of filthy localities. Medical men, I mean the majority, suppose that in these, from either a polluted state of the atmosphere, or the water in the wells containing malarious particles, the disease is more prevalent than elsewhere. Now it must be remembered, that in places where the condition is such, the population is generally greater considering the extent of area occupied; a population perhaps consisting chiefly of lower-class people, who can scarcely be expected to be in a position to attend as much to matters conducing to the welfare of their bodies as those whose affluence permits of their taking up their abode in less objectionable localities. It is not surprising therefore that many are attacked and die in filthy places.

The mere fact that a large number are attacked ought not to be taken as testimony in favor of the theory of poison, unless it can be shown that at least a comparative freedom from the disease is observed in localities similar as regards extent and population, but free from all sources of malaria, or that the number of attacks is proportionably greater than that noticed in open situations.

Supposing in a regiment composed of a thousand men and twenty officers, the men located in an ill-ventilated and filthy barrack and the officers occupying roomy houses in the open country, that fifty of the former were attacked and only one of the latter, I ask if it would be fair to regard the circumstance as affording, as a matter of course, weight or plausibility to the idea of a concentration of the poison in the barrack. It not unfrequently happens that while the disease is prevalent in a locality recognized as healthy that the people in a filthy neighbourhood are enjoying an immunity from it. Can those who advocate the poison theory explain this, a fact which they would be disposed to regard as an anomaly ?

I am aware that over-crowding sometimes, particularly

in ill-ventilated rooms, is efficacious in augmenting the fatality of cholera. I regard this as merely an auxilliary, operating when there is a comparatively small quantity of electricity in the air.

Now for the evidence considered conclusive and made use of in common with others in defence of the poison theory. It is stated that the two women who visited the Town of Dundee while cholera was prevailing there, were attacked on their return to Arbroath as well as the six people who visited them during their illness. This seems a strong argument in favor of the prevalent view. Is it not just possible that this is an exaggerated account given to a Medical man who took it for granted and recorded it as a fact? I could cite instances where such has been in reality the case.* It seems to me that there is no practice more common among people than that of amplifying on certain facts and observations particularly in reference to cholera. They have an idea that the disease is due to poison, and they will venture any statement likely to give confirmation to that idea. Sometimes these are in direct contradiction to the truth.

Admitting even the truth of the statement, cannot we be permitted to regard this circumstance as a mere coincidence? The instances in which the converse is the case are innumerable, and if these were only taken into account they would tend considerably to modify public opinion as it now stands.

Is it not notorious that Medical men and Hospital servants who have most to do with cholera cases enjoy a wonderful immunity from the disease? Does not this fact appear at variance with the theory at present in vogue? Are washermen more liable to be attacked than others? and do observations go to show that the proclivity to be attacked is greater among those who have to do with the cleansing of drains and latrines?

As regards the instance cited sometimes for the same purpose, viz., that in which mice fed upon pieces of paper previously soaked in the discharges of cholera patients exhibited symptoms resembling those present in many cases of cholera. I have to observe that as the mice experimented upon became ill only after partaking of those pieces of paper in which decomposition had set in, the result of this experi-

* See Report of the General Board of Health on the Epidemic Cholera of 1848-49, pages 34 and 35.

ment is far from conclusive, and favors in no way the poison theory. The explanation of the result is this;—the putrid matter in the prepared papers acted simply as an exciting cause, as putrid matters would on the human constitution. We know that putrid meat is capable of exciting a diarrhœa, which may eventually pass into cholera; and, because it does so, is it to be considered as the cause of cholera? I rather think Medical men would be loathe to admit this. It must not be forgotten also that the experiment upon the mice was performed during a cholera period, and we have testimony to the effect that the lower animals during such periods are liable to a disease not unlike cholera. The truth in this matter seems to me that the mice were simply so influenced by the cause which was operating upon the human constitution at the time, as to render them susceptible to take on disease, and this was merely excited by the prepared papers.

Dr. Copland says that "the lower animals are subject to a disease resembling, if not identical with, cholera, and about the same time as this disease is occurring among human beings:" and in the *Lancet* for 1854, page 113, the following remarks occur, "an interesting question connected with the pathology of cholera, is that of its relation to the lower animals. Contemporaneous with the prevalence of the disease in different districts and towns of India and Europe, certain partial or distinctly localized epizooties have been observed, and believed by many to be examples of cholera in the lower animals."

In bringing to a close this paper on cholera, permit me to observe that the views therein enunciated are intended to aid investigations into the cause and nature of this disease, and it is unquestionable we have yet to learn what these really are. Should this paper ever appear before the public I trust its persual will create a desire in the minds of those who take an interest in the subject, to initiate enquiry as to whether electrical changes in the air have, as I am inclined to think, a causal relation to cholera. I state a fact when I say that the electric theory is the *only one* by which so many of the phenomena of the disease can be accounted for:—this cannot be said of the poison theory.

I am sanguine that a better acquaintance with electrical phenomena will enable us ere long to explain many more, if not all, of the peculiarities of the disease.

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ART. XIV.—*On Cholera in Kurnool.* By Surgeon FRANCIS DAY, F.L.S. and F.Z.S., Medical Store-keeper, Presidency; temporarily attached to 28th M. N. I., Kurnool.

DURING the month of June 1866, a short but severe epidemic of cholera occurred amongst the Europeans in this station, a sketch of which may be interesting. Having been temporarily sent here, I have drawn up the following report mostly from the station records.

"Kurnool is situated in 15° 48′ north latitude, and 72° east longitude, upon a portion of the land formed by the junction of the Toombuddra and Hindrie rivers, elevated above the level of the sea 900 feet. It is the high road from Madras to Hydrabad, 300 miles distant from the former place, and 128 from the latter.

"The position of Kurnool with respect to the neighbouring country is low; it is bounded on the east by a low range of hills, while on the west the view is very limited—abruptly terminating at the distance of a mile or two. The appearance of the country is very bare and unprepossessing, the quantity of loose stones every where render riding and driving very unpleasant, whilst the scarcity of trees gives the whole an extremely uninteresting aspect.

"The Pettah and Fort are built on the south bank of the Toombuddra, which rises in the western ghauts, receives the Haggaree, and running eastward until it reaches Kurnool, joins with the Hindrie. The rise of the Toombuddra is very sudden, and its fall equally so. It is fordable from the end of December until the end of May, and it can be nearly always crossed in basket boats. The Hindrie is a small, rapid, serpentine river, rising very quickly and to a great height, and cutting off all communication with the opposite side. For many months it is a mere rivulet, and in places quite dry. After the fall of the river, vegetables and melons are planted in the beds of this and the Toombuddra. The climate of Kurnool is generally reckoned healthy. The mean temperature about 84°. The seasons are well marked; part of March, April, May, and June, are very hot; July variable; in August heavy rains and wind—generally westerly;—from the latter part of November till the beginning of February, it is cool and bracing—wind, principally north east. The soil is black cotton on lime stone; it is not deep, being covered with

lime stone schale. The roads in the wet weather from the nature of the soil are very much cut up, almost impassable. The productions are, sugar, cotton, tobacco; also vegetables and fruits, such as carrots, turnips, onions, beet, beans, peas, brinjals, cabbages, lettuces, plantains, oranges, pine-apples, pomegranates, mangoes, and melons. Many vegetable productions of the materia medica are to be found."—(*Yearly Report for* 1852).

The population of the town was given in 1845 at 20,019, more than half being Mahomedans. It is now estimated at 30,000, but these census returns can scarcely merit more consideration than rough guesses. The district may be said to be in a state of chronic famine, such being apparently the rule not the exception, but this, it is hoped, the irrigation works will at some future day tend to dissipate.

The thermometer, as taken during the years 1853, 1855, and 1857, gives the following results:—

	Maximum.		Minimum.
January.........	82	...	74
February........	85	...	76
March............	92	...	73
April.............	95	...	74
May..............	95	...	87
June.............	89	...	86
July..............	86	...	82
August...........	84	...	81
September......	86	...	83
October.........	86	...	81
November......	80	...	74
December......	79	...	73
Average........	86·50	...	79

showing a mean temperature for the year of 82·50.

The rain-fall for five years from 1857 to 1861, inclusive, gives about $24\frac{1}{20}$ inches yearly, divisible as follows:—

January.......	0	inches.	July...........	$4\frac{13}{20}$	inches.
February.....	0	,,	August.........	$4\frac{8}{20}$	,,
March.........	$0\frac{8}{20}$	,,	September.....	$4\frac{3}{20}$	,,
April...........	$0\frac{18}{20}$	,,	October.........	$2\frac{6}{20}$	,,
May............	$2\frac{6}{20}$	,,	November.....	$1\frac{1}{20}$	,,
June...........	$4\frac{8}{20}$	,,	December......	0	,,

During the year 1860, there was an abnormal rain-fall of 17 inches, whilst in none of the other four years under review did it exceed 5·50 inches. in any one month.

Cholera is one, if not the chief, scourge of Kurnool, and it appears to return almost every year, unless it is continuous from the preceding one. In fact, so frequent are its outbreaks, that the Civil Surgeon observed in 1861 as a remarkable fact, "both the town and district of Kurnool have been almost entirely free from epidemic diseases, only some sporadic cases of cholera having occurred."

The following are the dates, as well as I can ascertain them, from the old records, of the outbreaks of this disease in an epidemic form since 1844:—

		Deaths.
1844	commenced Oct. 1st, continued all the year.	630
1845	continuous from last year, ceased in April.	
1846	commenced in March, „ „ October.	226
1847	? ?	?
1848	absent ... ... absent.	0
1849	commenced April 30th, ceased September 28th.	501
1850	„ June 9th „ December 23rd.	488
1851	present ?	?
1852	absent ... ... absent.	0
1853	commenced April 24th, ceased November 28th.	278
1854	„ May 10th ?	?
1855	„ Oct. 23rd, ceased December 6th.	159
1856	„ March 4th „ April 20th.	35
1857	absent ... ... absent.	0
1858	absent ... ... absent.	0
1859	commenced March 22nd, ceased October 30th.	659
1860	„ March „ July.	111
1861	sporadic cases ?	?
1862	commenced June 9th, ceased August 23rd.	222
1863	„ Aug. 1st „ November 12th.	114
1864	„ June 17th „ September 1st.	186
1865	„ May 11th „ August 31st.	83
1866	„ May 23rd „ present.	138

The foregoing figures, although incomplete, give some idea of the virulence of this disease in the town of Kurnool, where it has only been reported as absent during four years, and in a fifth as sporadically present, from 1844 to 1866 inclusive. In three years the numbers of deaths are omitted. During 1847 and 1853 the periods of the outbreaks are not re-

corded. It may however be safely assumed that during the last 23 years cholera has been epidemically absent in five. That in fourteen epidemics in which the mortality has been recorded, extending over fifteen years, 3,830 persons have succumbed to it, or an average of 255 annually whilst it was present: or adding the five years when it was epidemically absent, we obtain an average of 191, or about one in every 150 of the population of Kurnool, dying yearly from this disease.

Thus in fifteen outbreaks and thirteen cessations of these epidemics they occurred as follows:—

	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.
Commenced.........	4	2	3	3	0	1	0	2	0	0
Ceased...............	0	2	0	0	1	2	2	2	2	2

Therefore from March to June this disease may, with the greatest probability, be anticipated to commence in the town of Kurnool, or during the hot dry months, especially when atmospheric disturbances are present, and any immediate alteration in the rain-fall takes place, such as in March and April when the first showers fall, in May when there is a considerable increase in the moisture, or in June coincident with the S. W. monsoon. The cessation of the epidemics may most reasonably be expected when heavy downpours occur, or in the colder months.

Causes for these outbreaks have been advanced in many ways; infection, its introduction by travellers, the overcrowding of the town during the festival of the Mahorrum, and sporadic origin, have all been adduced. But whilst each of these theories have had their advocates, they have also had their opponents. I propose giving a short summary of some of the opinions of my predecessors, or rather, since I have not been placed in civil medical charge, I should say of those Medical Officers who have been stationed here before I was sent and who were in civil medical charge of the station.

The vexed question of the infectiousness, or non-infectiousness of this disease, may now almost be considered as set at rest. There being little doubt that persons in a certain predisposed state of health may receive the germs of cholera from those who are suffering from it, by approaching too near their dejections, and probably even by contact with their clothes. At the same time it is not shown that atmospheric influences do not likewise induce this; in fact, it seems probable that in some spots in India the germs of

cholera are invariably present and only require certain extraneous causes to arouse them into action ; what these causes are, it is as yet almost impossible to decide. The following is the opinion of one civil surgeon who was opposed to the theory of infection. I use the term "opposed," because I consider that he denied the disease to have been simply so spread, but believed an epidemic influence disseminated the poison. He observes, "In February 1856 diarrhœa became somewhat prevalent especially in the sepoy lines, but succumbed to mild treatment. Towards the end of the month, and the early part of March, diarrhœa increased, and many of the cases assumed a choleraic character. On the 4th of March two cases of decided cholera appeared, the first occurred a mile distant from the Fort, in a house on the opposite side of the Hindrie river. The second person attacked was a young officer living in the Fort, and a few days afterwards, the wife of the commanding officer of the 44th Regiment. No cases of cholera were reported in the Pettah until March 12th. The first person attacked in the jail was a prisoner who was under trial, and who had been in confinement about a month.

"Between the 28th March and 9th April, seven persons were attacked with the disease, of whom four recovered and three died. The epidemic was of short duration, lasting from March 4th until April 20th; during which time 79 cases were reported, of which 35 proved fatal.

"It is worthy of remark that the places of residence of the three Europeans first attacked with the disease, were at a considerable distance (about one mile apart) from each other. There was no possibility of contagion, and at that time not a single case had occurred in the native population in or around Kurnool.

"It is also deserving of notice, that on the outbreak of the disease, the Europeans were attacked before a single case had shown itself amongst the natives of the town, and during the progress of the epidemic there were few of the European residents who did not suffer more or less from diarrhœa."

The following instance shows how the disease may be conveyed from place to place and spread by infection. In 1850, "No case of cholera had occurred in Kurnool for nearly a month, when the 15th M. N. I. who were suffering

severely from it, on their march from Bangalore to Secunderabad, were halted at Chinna Tykoor, 7 miles from Kurnool (not being allowed to enter Kurnool in consequence of the sickly state of their camp). A number of the followers came into the Kurnool Bazaar and into the Regimental lines, a boy in the latter was a day or two after attacked and died, and it appeared to be a solitary case. Some days afterwards, the town being then perfectly free from the disease, a Peon who had been with the troops for some marches returned and the same day was seized with cholera and died. For a few days it confined itself to the neighbourhood of the Peon's house (situated in the bazaar near the river), it then spread taking the course of the river, and afterwards was general, some cases occurring nearly a mile and a half from the spot where it first appeared. It subsequently spread to all the villages."

In 1863 the following account is given of the advent of the disease: "Kurnool is connected with Cumbum, where the cholera first appeared, by a road in a S. E. direction, 110 miles long, which passes through Nundial. The disease seems to have travelled up to Kurnool along this road. In the middle of September the disease appeared amongst a gang of coolies working on the irrigation canal at Khaderabad, a village 5 miles S. E. of Kurnool on the above road. It appeared there, I heard, in a virulent form, and caused the coolies to disperse in every direction, many of whom, I have no doubt, came into the town of Kurnool. * * *

"Five cases of cholera occurred in the town of Kurnool in August, at distant intervals, but the disease did not prevail epidemically until it was introduced from Khaderabad."

Subsequently taking some of the foregoing suppositions as ascertained facts, the civil surgeon makes the following deductions: "that the disease travelled from Cumbum to Kurnool along the high way, in a westerly direction and in the face of a strong westerly wind. That it finally ceased at Kurnool, because there was no high road in a westerly direction." Without wishing to appear to criticize the above, I cannot but observe that there is no evidence, but only supposition, to prove that the disease travelled along the intervening 105 miles from Cumbum to Khaderabad; and, secondly, that evidence is also wanting that any of the coolies attacked in the latter place ever came into Kurnool.

The sudden and virulent outbreak at Khaderabad, may have been partially due to atmospheric causes, and so may have been that at Kurnool, for it is shown that cases were occurring at that time in the town.

The history of the epidemic of 1865 is detailed in the yearly report:—" On the 20th of April the Police reported that two bandymen from Bellary arrived at the band-stand suffering from cholera. On the 23rd April, a bazaarman who had recently returned from the Humpy fair near Bellary, where cholera was prevailing, was attacked with the disease and died on April 28th. His house was, unfortunately for others, situated in the rice bazaar, a crowded part of the town.

" On the 9th of May, twelve days after the death of the bazaarman, one inhabitant of Zorampooram (a suburb of Kurnool) died of cholera. On the 11th of May three cases of cholera were reported, and ten on the 12th, of the former all died, of the latter five died."

The following deduction was drawn from the foregoing, " that the epidemic entered the town of Kurnool from the Bellary district." But it would have been more satisfactory, had it been shown that the second case had ever been near the first, for they evidently resided a long distance apart; also records are wanting to show whether the succeeding cases were of the same class, religion, or caste, as those first attacked; and nothing is stated as to whether the epidemic broke out in one part of the town first, or in all simultaneously.

In 1845 it was observed that " it seemed to reach Kurnool from the south, gradually extending to the north and east. No village is reported to have escaped; in some the mortality nearly depopulated the locality."

But there are some epidemics in which infection is not shown, and which may have been due to some atmospheric or telluric influence. In these I include sporadic attacks and epidemics breaking out as far as can be ascertained from local causes. In 1851 " cholera first appeared in its usual place, the dirtiest part of the town, at the back of the Ameen's choultry, and spread with great rapidity to all parts of the town, the Regimental lines, however, and Nova Pettah escaped." In 1854, " on the 10th of May cholera broke out amongst the coolies on the roads in an epidemic form, and

during the first 24 hours, 30 are reported to have died." But there is an objection to considering the first of these outbreaks of sporadic origin, because although the part of Kurnool mentioned deserves the character given it, still there is a large choultry for travellers, situated close to the side of a well, from which persons in that portion of the town obtain their drinking water, and filth from the former could easily flow into the latter.

Local atmospheric changes have been alluded to by several medical officers as preceding outbreaks of cholera. In 1856, "For some weeks before the appearance of the disease, the weather had been unusually oppressive and sultry for that season of the year; the thermometer at noon standing from 85° to 90° in the shade. About the 12th of April we were visited with storms of high wind, the thermometer falling to 83° at noon. From this time the epidemic began to abate, and by the 20th had entirely disappeared."

In 1859 it is stated, "Previous to the outbreak of this disease, the electrical equilibrium of the atmosphere had been greatly disturbed, evidenced by a peculiar heaviness and oppression experienced; and rising from the eastward for several evenings a succession of banks of heavy clouds, accompanied by sharp thunder and lightning, and showers of rain." * * "In June a strong wind was blowing from the west, season dry, the want of rain had been severely felt, and it was anxiously looked for. To this dryness and want of rain, public opinion chiefly attributed the prevalence of epidemic cholera, which had for some time been ravaging the station and district."

In 1862 it was observed, "Shortly before the final disappearance of cholera, there was a temporary increase for four days, from the 12th to the 15th of August, coincident with an unusual stillness and oppression of the atmosphere." This stillness and oppression of the atmosphere was also present prior to the outbreak of cholera this year, conjoined with occasional high winds, and dust storms. On the other hand, in 1855, it is stated, "I was not able to observe any particular atmospheric phenomenon, the season was much as usual, except perhaps that more rain had fallen in October."

It is only of late years that any remarks have been made in the station records on the bearing that the congregation of natives for the Mahorrum may have had in causing an outbreak of this disease. As many as 15,000 persons are

estimated to flock into Kurnool for this festival. The town becomes overcrowded, and the people give themselves up to revelry day and night. They take their meals at irregular times, and their diet is often what they are not accustomed to, whilst there is great excitement which must be followed by corresponding nervous depression. However, the dates at which the various epidemics occurred, scarcely show that these causes have exercised very much influence in the production of the disease, although there can be hardly a doubt that they must augment the virulence of the epidemic when it is present; and the feast and the outbreak may occur at the same time due to the Mahorrum being in May or June. In 1864, "Cholera broke out in Kurnool on the 17th of June, the day following the close of the Mahorrum. * * * The excessive crowding of an already overcrowded town during the festival, and the filth resulting therefrom, had originated the disease. From the town the disease spread to the surrounding villages." In 1866 the epidemic again commenced after the Mahorrum.

The course taken by the disease has not always been the same. Thus, in 1845, "Its ravages were principally confined to the Pettah, although several fatal cases took place in the Fort, and in the lines of the 29th M. N. I., whilst there was not a case in the Rassala lines, or in the Jail. During its prevalence, the weather was deliciously cool, morning and evening, with a not unpleasant degree of warmth during the day, though little rain fell, and the nights were chilly. Wind East and North East, having just veered from the West at the commencement of the cold season. Average range of the thermometer 79°; an almost total want of rain this season." In July 1859, "Rain fell plentifully, and the disease ceased, suddenly it re-appeared in September, continued with increased virulence in October, and finally disappeared from the station on the 30th of that month." In 1863, "It prevailed in September and part of October, during which period rain fell, and a high westerly wind was blowing, showing that rain and wind are not sufficient to drive this disease out of a town, when other circumstances are favourable to its propagation." In several different years it was observed, that sudden exacerbations of the disease for a few days, with increased virulence in the attacks, occurred. In 1853, "The disease declined until the 28th of November (the cool weather having fairly set in) when it entirely ceased."

Before adverting to the immediate causes which have been advanced by various civil surgeons in Kurnool, to account for the outbreaks of epidemic cholera, it may not be amiss to suggest, whether the presence of filth can, amongst some classes, be assumed to be the cause of this disease locating itself in spots where they reside? Is it not possible that half measures in sanitary matters are a mistake? Can we not suppose that people bred up from their infancy in filth, and luxuriating in intemperance, might become more predisposed to attacks were they to suddenly change their modes of living, and to reside in a semi-clean town? Records from our improved modern Jails in India might furnish some useful information on this head.

I here give a synopsis from an interesting account left by the last civil surgeon of this place, and whose loss appears to be much felt by the inhabitants. It has reference to a visit he paid to one of the villages near Kurnool, situated on the S. E. bank of the Hindrie river. It is divided into three portions, the largest of which is occupied by Chucklers, the next by Malas and Pariahs, and the remainder by Basket makers. All agree more or less in their habits, except that the latter class are temperate, and do not eat the flesh of animals which have died of disease. The Chucklers, Malas, and Pariahs, are to a man drunk after 4 P.M., daily: they partake freely of the flesh of animals which die of disease, obtaining such about once a week, only rejecting such as have been poisoned, or died from snake bites or scorpion stings. After cooking, they insert a red hot sickle into it, leaving it there until cold, under the belief that such a proceeding destroys all deleterious effects. They deny being subject to diarrhœa, or any other bowel affections, and stated that only three persons died of cholera during the late epidemic visitation (1864) in the chucklers' portion of the village, where they number 200 souls. They pride themselves on drunkenness, and train up their children to follow that mode of life. They wash themselves once in two months, the floors of their huts once a week, and chunam the walls yearly. The village was found to be filthy, but, in spite of all this, to them it seems to be a healthy abode.

During my late journey from Cuddapah to Kurnool, the difficulty of procuring bullocks, usually led to my being compelled to proceed personally into the villages, to argue with the native authorities, and persuade them to furnish

me with fresh cattle. During these visits, the effluvia at night time was overpowering, reminding one of a dysenteric sick room in which all the windows and doors had been kept closed for twenty-four hours. Mud in the roads mixed with offal was nearly ankle deep. On the occurrence of cholera, these villages become such hot-beds of it, that an immediate flight from the infected locality is generally said to be the only effectual way of escaping the disease. But these people do not indulge as the classes just adverted to.

As regards the local causes of the disease, in 1851, it was stated, that "Kurnool, with its narrow and dirty lanes, crowded houses, dense population, and deficient sanitary regulations, is most favourably situated, both to originate any epidemic disease, and when originated, to retain it." In 1845, it was observed, that, "In consequence of the famine, inferior cholum which had been preserved under the ground for several years, was being sold at immoderate prices, and that such kept up the disease." During the Mahorrum in 1863, it was brought to notice that, "The toddy sellers collect as much toddy as possible for two or three days immediately preceding the close of the Mahorrum, in order to sell it at a higher price on the last day of the festival to the thousands which resort to the toddy-shops. They seat themselves under a burning sun, in the open air, and drink freely of this decomposing fluid; at the same time they consume great quantities of coarse curry, made from the entrails of cows, and sheep, and half rotten mangoes." The odour issuing from the dregs of oil seeds, were also pronounced prejudicial to health, and the manufactory was proposed to be removed to a distance from Kurnool.

It is, says Dr. Keess, a popular belief in Kurnool that during the prevalence of cholera, the common kites, *Milvus Govinda,* absent themselves until the disease leaves the station. The same phenomenon has been observed elsewhere; thus in the *Levant Herald* for September 6th, 1865, it was observed that at Constantinople "the birds of every kind, from the sparrow to the sea gull and kite, absolutely disappeared from the capital within a week after the outbreak of the disease, but after it had ceased all reappeared."

The dissemination of the disease, after it has once commenced, no doubt occurs in various ways. Exclusive of epidemic, and immediately infectious modes, there are others

apparently acting in a secondary manner. Here I will commence by making a synopsis of a letter from the late Assistant Surgeon W. R., which is especially interesting, but for the purpose of obtaining his information he appears to have passed June 26th, 1866, whilst cholera was present in the town, inspecting the nuisances of Kurnool; his wife was attacked the next day with cholera, but recovered. During the succeeding 24 hours he also had the disease from the effects of which he died.(1)

Of the privies in the native part of the town not one was clean, the stench from some so great as to prevent entrance. One large one was situated close to and above the well which supplied most of the town with water. Some natives allowed buffaloes and donkeys to act as scavengers in their privies: in all the larger ones he observed several individuals of each species feeding off fæcal matter, in one a buffaloe licking up a diarrhœa stool. He observed that "the beast would most probably next put its mouth into some vessel or tank containing water for drinking purposes, and in the evening would be allowed to go into the yard attached to the hut of its owner, carrying there on it hoofs a quantity of filth enough to breed any pestilence." A square in the very heart of the town was occupied by above 500 buffaloes, whilst the butchers were washing tripe in front of their stalls!

The extent to which lower animals can disseminate this disease, deserves particular attention; for where the rule—not the exception,—is for human beings to go into the streets, alleys, and compounds for the purposes of nature, or even if they have privies, such being open to lower animals, it must follow that the excretions of some at least of those who are suffering from cholera or choleraic diarrhœa during epidemics of this disease, are present in the public thoroughfares. Assuming, as I believe one is bound to do, that cholera is infectious, especially from the excretions of those suffering from the disease, either in the slightest or most intense degree, it may, or I might say, must, follow that lower animals extend the disease by carrying the principles of infection about on their hoofs; or after having lain down on the ground where dejections have been passed, subsequently taking portions away to other places. It is true that we are at present hardly in a position to assert that

(1). Under the *new Medical regulations*, is it a fact that widows of Assistant Surgeons only obtain pensions of £ 25 a year?

lower animals are affected by this disease, or that it could be spread by eating their flesh after they have indulged in repasts of choleraic dejections, should the meat in cooking have been subjected to a temperature of 212° Fah.; still one could not recommend it for human food.

Buffaloes in Kurnool appear to do the duty of pigs in Hindu towns, and have long been its recognized scavengers;—thus, in 1863 it was stated, "the prisoners are taken twice a day to a ditch, at a short distance from the jail, for the purposes of nature. The ditch is soon after cleared of every vestige of filth by buffaloes, which are the chief scavengers of the town." Imagine milk from such creatures being used as food. Even in the best of times horse-manure is given them to eat! The early riser in Kurnool, if he keeps his eyes open, must observe that the lower classes of Mahomedan females, go into the public roads for the purposes of nature, and the buffaloes perambulate the thoroughfares at dawn to collect this food, which they seem to relish! Tastes differ, but the donkeys agree with the buffaloes, in eating such when procurable!

The year 1866 has formed no exception to the usual rule of the prevalence of cholera in the station during the hot dry months, but before entering into any description of the epidemic, I will give the police returns of the number of persons attacked and the deaths. These figures, however, must not be considered correct, but only approximating to correctness.

From May 23rd to 25th, 1866: number attacked, 4; died, 4.

„	„ 26th	to	June 1st	„	„	„	22	„	11
„	June 2nd	„	8th	„	„	„	15	„	3
„	„ 9th	„	15th	„	„	„	28	„	7
„	„ 16th	„	22nd	„	„	„	34	„	17
„	„ 23rd	„	29th	„	„	„	109	„	45
„	„ 30th	to	July 6th	„	„	„	42	„	18
„	July 7th	„	13th	„	„	„	11	„	6
„	„ 14th	„	20th	„	„	„	2	„	0
„	„ 21st	„	27th	„	„	„	5	„	5
„	„ 28th	to	Aug. 3rd	„	„	„	0	„	0
„	Aug. 4th	„	10th	„	„	„	3	„	3
„	„ 11th	„	17th	„	„	„	0	„	0
„	„ 18th	„	24th	„	„	„	2	„	1
„	„ 25th	„	31st	„	„	„	8	„	4

From Sept.	1st to	Sept.	7th	1866;	number	attacked,	2;	died,	1
,,	,, 8th	,,	14th	,,	,,	,,	5	,,	2
,,	,, 15th	,,	21st	,,	,,	,,	8	,,	7
,,	,, 22nd	,,	28th	,,	,,	,,	4	,,	2
,,	,, 29th	Oct.	4th	,,	,,	,,	2	,,	2
						Total...	306......		138

How the epidemic originated? whether infection could or could not be satisfactorily traced? whether it occurred from atmospheric or telluric causes? or was merely consequent on the overcrowding, and dissipation of the Mahorrum, after which festival it commenced, I have no means of correctly ascertaining, so omit all surmises. Still a few remarks are here necessary, because it has been strongly asserted, that the epidemic was due to the Mahorrum. It can scarcely be conceived, that such would induce it, excepting that it causes a number of persons to flock into Kurnool, many of whom may come from districts in which this disease is in existence and may thus bring it into the town with them. After the feast the dissipation is no doubt followed by nervous depression, rendering them more liable to attacks of epidemic disease. Overcrowding also increases filth, and in Mahomedan towns, when there are many strangers, few respectable mussalman women will go outside their compounds for the purposes of nature, thus the filth becomes concentrated, and the bad effects of this is still further augmented, by the high stone walls around the houses, which impede the free circulation of air, and in the hot weather by absorbing the heat in the day time render the atmosphere still more oppressive than it would otherwise be. But if we turn to figures, and examine this question by reference to dates, we find that when the Mahorrum occurs in the hot months of the year, it may be coincident with an outbreak of cholera, and from this we may also fairly conclude, that it is probably one of the causes of its development and dissemination. In the last three years, the Mahorrum and the cholera have occurred as follows:—

1864	Mahorrum,	June 7th,	Cholera,	June 17th.
1865	,,	May 27th	,,	May 11th.
1866	,,	,, 17th	,,	,, 23rd.

In 1865, the epidemic is said to have been brought in from the Bellary district; any how, it was in full virulence before the Mahorrum. In 1864 and 1866 it broke out

commensurate with the termination of that feast. It cannot but be admitted, that these coincidences are remarkable; but if we turn back to the dates of the previous outbreaks, and those of the Mahorrum, the coincidence vanishes: thus in 1844, feast January 23rd, epidemic October 1st; 1846, feast January 2nd, epidemic March; 1849, feast November 17th, epidemic April 30th; 1850, feast November 6th, epidemic June 9th; 1853, feast October 5th, epidemic April; 1854, feast September 24th, epidemic May; 1855, feast September 14th, epidemic October; 1856, feast September 2nd, epidemic March; 1859, feast August 2nd, epidemic March; 1860, feast July 20th, epidemic March; 1862, feast July 2nd, epidemic June; 1863, feast June 21st, epidemic August.

In 1866, the epidemic at first confined itself to the native inhabitants of the Pettah and Fort. Only one sepoy was attacked and he recovered, and one European Officer died of cholera shortly after his return in June from districts infected by it. On June 23rd, the disease suddenly commenced in the Regimental lines, one sepoy was attacked and died, the next day a second was admitted into hospital with it, and the epidemic still further spread itself to the servants of the European Inhabitants, who, until then, had remained free; it also showed itself amongst the mounted police. On the 27th it invaded the Europeans, and so severely, that seven were attacked within four days, four of whom died.

There was nothing particular to observe regarding the attack in the lines, which are situated upon a slightly rising piece of ground, nearly midway between the rivers Toomboodra and Hindrie, and to the west of the Fort, from which they are divided by the parade ground. I should mention that the wall at this spot has been partially levelled. As a rule, the lines appear to have been remarkably free from this disease, considering how it has scourged the inhabitants of the town. During this epidemic, five sepoys were attacked, one on each of the following days: June 7th 23rd, 24th, 27th and 28th, the second and fourth died, the other three recovered.

The peculiar stillness of the atmosphere during the day time, and the dust storms towards evening, which occurred prior to this outbreak, I have already alluded to. Otherwise the only peculiarity was a sudden fresh in the Toomboodra river. No rain fell.

As far as I can ascertain, ten servants or members of their families residing in the houses of Europeans, were attacked between June 24th and June 30th, five died and five recovered. It is a remarkable fact, that with one exception, these servants belonged to masters who were not subsequently attacked; in the solitary exception, three persons in the house had cholera, two of them died, but Mr. T. recovered; also in a second instance, one of the European victims had been engaged the day before he was himself attacked in treating two cases of choleraic diarrhœa in servants at his next door neighbour's with chlorodyne. The Assistant Surgeon, as already remarked, no doubt contracted his attack whilst in the execution of his duty, and he also most probably infected his wife, by means of his clothes.

During June, the number of Europeans residing in Kurnool was as follows:—13 adult males, 10 adult females, and 13 children. Out of these 7 adult males were attacked, or upwards of 53 per cent., of whom 71 per cent. died. Of the females, 1 or 10 per cent. were attacked, none died. The children were entirely exempt.

For the sake of convenience and explanation, the houses of the Europeans may be divided into those within the Fort, and those in the Midan, or open space, covering much of the ground between the rivers Toomboodra and Hindrie (excluding the Fort, Pettah, and Regimental lines) and having the irrigation canal running across its base.

The houses within the Fort must be subdivided into two portions, first those on its river face, extending about half a mile along its south bank, and immediately facing the stream. They are six in number, all inhabited by Europeans; four being up-storied, two (Nos. 4 and 6) single storied, these last two being divided from the river wall of the Fort by a narrow public road. The up-storied houses, built upon the walls of the Fort, are of substantial stone. The roofs of all are flat. The attacks of cholera or choleraic diarrhœa were as follows in the different houses. No. 1 free: No. 2, one European attacked June 30th and recovered, one native Butler, his wife and child attacked, the last two died, one on June 29th, the other on the 30th: No. 3, a house servant attacked on June 27th and died: No. 4, no attacks: No. 5, one servant attacked and recovered: No. 6, no attacks. Consequently, along the river face of the Fort, out of six houses inhabited by 8 adult Europeans and 4

children, 1 adult European had choleraic diarrhœa, 5 native servants or members of their families were attacked, and 3 died. But I should also add that amongst the remaining adult Europeans only 2 escaped diarrhœa to a greater or lesser extent during the progress of the epidemic, and in some this was conjoined with vomiting. It is certainly remarkable that these houses escaped so lightly, that the only European attacked in them recovered, whilst the cases of diarrhœa did not assume a choleraic type. It is true that a second case occurred in house No. 5, at least was treated there, but the officer, although passing most of his day time there, invariably resided in another bungalow within the Fort, away from the river. His attack may, therefore, be fairly attributed to his own house, but may not his recovery be due to the locality where he was treated?

The houses within the Fort, (as distinct from those upon its river face) and which were inhabited, also lie very close together, and are surrounded by those of the native residents. Nothing is particularly worthy of note respecting them; all are single storied. In one an officer already referred to, was attacked on June 28th, and recovered, whilst not far removed was the house of Assistant Surgeon W. R., whose wife had been attacked on the 27th, but recovered, he was next a patient on the 28th, and died on July 1st. Here I cannot but observe upon the certainty with which infection can be traced, although the epidemic was then in the town. It is almost clear that in the zealous and energetic discharge of his duties he went to places where the elements of infection were present, and as he has so well described how lower animals can carry it away on their feet, it seems more than probable he furnished an example of how human beings going into foul privies can also disseminate the disease. On the next day his wife was attacked; the day after himself. All records about the servants in those houses are wanting. Of three officers one died, the other two went away sick.

In the Midan, I include those houses which have already been stated to occupy an open space situated between the rivers Toomboodra and Hindrie, and having the irrigation canal along its base; the soil is black cotton, rarely if ever above ten inches in depth, and overlying a slaty limestone, the same as exists elsewhere. Its extent is about one quarter of a mile in width, and half a mile in length, and out of seven houses only two entirely escaped. The cholera line—

if I may so express it—commenced near to the base of this piece of country, at house No. 1, where on June 24th a native servant was attacked and died: No. 2 escaped: in No. 3 the Officer died at the commencement of June: in No. 4 the owner was attacked on June 30th and died the next day: in No. 5 two servants were attacked on June 26th and recovered, they were attended by Mr. G., who, himself contracted the disease on the 27th and died on the 28th. Passing from house No. 4 there are two others leading down to the Hindrie river, the first entirely escaped, in the other the owner was attacked and died. Three other houses along the banks of the Hindrie were also inhabited by Europeans, two on its northern, and one on its southern, side; in none were any of the Europeans attacked, but in No. 2 on the north side 2 servants were attacked on June 27th and July 2nd, but both recovered, and one servant in the house on the south bank, who died. Few, if any, of the Europeans escaped simple diarrhœa at this period.

Omitting the first case of the Officer, which occurred in the Midan prior to the virulent outbreak amongst the Europeans, we come to the examination of those who were first attacked. It appears that Mr. G. had passed the day prior to his contracting the disease, in treating two cases of choleraic diarrhœa, in a house (No. 5), where he was himself attacked, and that so suddenly that he could not be removed to his own residence. I cannot trace any communication from one case to another after the first few, and in one instance a patient vomited over the beard of another European who was attending him, but the latter did not contract the disease.

This sudden outbreak amongst the European community, —as virulent as it was short,—has not been of infrequent occurrence in Kurnool during these epidemics. It can scarcely be entirely due to infection, and is most probably assisted by some atmospheric cause, and if we turn to the general mortality at this period in the town, we observe, that although the relative mortality to attacks did not augment, the number of attacks more than trebled in the week, and as suddenly sank the week after. In fact the same causes which were acting upon the Europeans were also in existence amongst the natives(1) in the Bazaar.

(1) It is a great mistake that the mortality returns of Kurnool are added up without any division between the Hindus, Mahomedans, East Indians, and Europeans.

It is scarcely worth while to enter here upon the treat adopted. The natives do not believe in the European d and rarely apply for advice until just about expiring. civil surgeon remarks, "there have never been more two cases of cholera at a time treated in the Civil Di sary." The natives trust to cold water and starvatio several days after the disease has passed off. Do the quicker or in a larger proportion than those treated ?

The question of precautionary measures which shou adopted in Kurnool opens a wide field for discussion requires that before advancing his theories a person sl have lived some time in the place, and closely studie manners and customs of the people. Not having this, and having been absent during epidemics, I can give opinions suggested by the various civil surgeons have been here, on the result of a short observation o place.

Acting on the belief that the disease, although a pheric or epidemic, is also infectious, which infection be spread by human beings or the lower animals, I v suggest whether some of the following observations n not deserve attention.

Amongst the pests of the town are buffaloes and don met at every turning, poking their noses in at every they seem ubiquitous. Municipal taxes are extend cows, but these other four footed creatures escape ; s they are as fit objects of taxation as cows. Again a p for stray cattle appears to be unknown, one is urg necessary, and not only so, but stray animals should b mediately pounded. Whilst cholera is about, no mea could be too rigorous to prevent their disseminati through the place ;—even dogs should be tied up

The water supply should claim especial attention. wells near privies should be closed ; and *should the i tion channels contain water during the next epidemic* should be well looked after, for they flow through the at the sides of the public roads and, besides being us drinking purposes, are also used for ablution. Not only s they be securely covered over except in certain place no penalty could be too severe for those who commi sances near where they flow. Fæcal evacuations from cl patients spread the disease, may not urine do so also ?

beetles, and many insects may after settling in choleraic dejections, also probably carry it to other situations. The Police must be much improved before they can be expected to assist in preventing public nuisances.

The question of public privies in these seasons deserves especial attention, whilst the dry conservancy system should without any doubt be carried out. Dejections of all cholera patients should be buried or rendered innocuous, and care be taken to keep the healthy as much as possible away from the sick.

As regards the Mahorrum, it would probably be impossible, as has been suggested, to prevent the great influx of visitors to this feast, but Police regulations strictly carried out might obviate much of the mischief. Extra sweepers should be kept to clear away all accumulations of filth. All tom-tom beating and processions should be interdicted between 10 P. M. and sunrise the next day. A strict supervision should be kept over the liquor and food sold, and all who mixed adulterations (as stramonium) with the former for the purpose of causing excitement should be heavily fined.

Segregation of human beings in a country like this can hardly be carried out; quarantine regulations between villages could scarcely be successful, but the segregation of lower animals is not only possible but easy. Let the local Civil and Military authorities earnestly co-operate with the Medical Officer, and no doubt much of the mischief may be prevented or at least mitigated.

Many regulations in addition to those here indicated are necessary in this town, which, however, is immeasurably cleaner than the villages in the District. Its drainage especially requires great improvement. But I leave it to those who have resided longer in Kurnool than I have to point out the various desiderata, for, as I explained at the opening of this paper, I am scarcely more than a stranger in the place.

PART II.

REVIEWS AND NOTICES OF BOOKS.

Hand-book of the Indian Flora; being a guide to all the flowering plants hitherto described as indigenous to the continent of India. By Lieut.-Col. HEBER DRURY, Author of "*The Useful Plants of India.*"—2 vols. Travancore Sirkar Press, 1864—1866.

The Treasury of Botany. A Popular Dictionary of the Vegetable Kingdom; with which is incorporated a Glossary of Botanical Terms. Edited by JOHN LINDLEY, P.D., F.R.S., F.L.S., &c. &c., and THOMAS MOORE, F.L.S., Curator of the Chelsea Botanic Garden, &c. &c. London: LONGMANS, GREEN AND CO.—2 vols. 1866.

OWING to various causes, the science of Botany, once so zealously and lovingly cultivated in India, has fallen into a strange neglect, and we are afraid that this decadence is only a reflection of the low estate it has reached in the mother-country.

Not very long ago it was thought that the education of a medical man was incomplete without a fair knowledge of the vegetable kingdom, combined with a fair knowledge of Latin and Greek; but, to-day, it appears that both Classics and Botany are alike neglected, the reason being, in the first place, that scholarship and the science whose decline we bewail, have a very small immediate market value.

In our own student-days Botany was taught for three months during the summer, three lectures, of an hour each, being delivered in each week, to the smallest of classes, and during this short session of thirty-six lectures, the students imbibed so much, or so little, as they thought proper of the science.

Only one examining board required Botany, *The Hall*, and at *The Hall* no man was ever plucked for Botany, or rather for ignorance of it; so then *cui bono* Botany when there was such a host of other subjects to take up?

At the private classes in London a botanical *séance* was held on each evening preceding the *Hall* examinations, when the Grinder drew attention to a bouquet of unfamiliar looking flowers placed in a cracked tumbler on the table at which the students sat.

By a remarkable coincidence a similar bouquet was to be seen at the *Hall* at the succeeding examination, when the prescience of the Grinder was rewarded by the most charming results, his pupils passing through the plant ordeal brilliantly.

So, Botany claimed about as much attention at the hands of students, during their curriculum, as did the anatomy of the internal ear, concerning which it was said that no man had been known to get this special part at the College of Surgeons within the memory of man, save one unfortunate, who, having been rejected on account of failure in the ear, promptly blew out his own brains in Lincoln's Inn Fields and covered the Board of Examiners with confusion and remorse. It was said that at one of the collegiate banquets succeeding this tragedy, the Examiners registered a tremendous oath never again to pluck a man on the internal ear, and on this account the *malleus*, *incus* and the *stapes* came to be treated with utter indifference, not to say contempt, at the various schools.

It is said that more men are rejected at the University of London examinations on the score of ignorance of Botany and Natural History generally than for any other cause. This at least ought to bring back Botany from the limbo of neglect it has fallen into, so far as the Alumni of that University are concerned, those pale consumers of the midnight oil, those swillers of green tea, those encyclopædias of learning, who, if they do not, as a rule, stand in the very first rank of successful practitioners, ought and deserve to do so.

Botany, except in the above instance, does not commend itself to the student as a study of necessity, hence one reason for its present neglect, the art being a strictly utilitarian

one, but why, we would ask, has it fallen into disfavour as a study of love, as a recreation and a most agreeable mental discipline ?

Perhaps it is because the microscope, with animal histology, and organic chemistry, and ophthalmoscopes, and rhinoscopes, and laryngoscopes have elbowed it out of the way ; perhaps because the Latin and Greek words are difficult to understand and irksome to remember ; perhaps it is because the students seem to notice that the night bell and knocker of the Botany Professor's door bear but few signs of being much used,—an he be a doctor,—and, again, perhaps it is because the student has really too much to do during his school career to allow of the study of Botany at all.

Our remedy for this would be to make students take up Botany with Chemistry at a preliminary examination, prior to their commencing attendance at Anatomy or Physiology at all.

Through many causes then it falls out that Doctors start on their various careers, now-a-days, with very little Botany in their knowledge boxes, and those who cast their lot in India are no exception to this general rule.

The small number of the latter class, who do cultivate Botany, take it up after their arrival in India as a rule, teach themselves the science, and taste a new and rare pleasure, where our pleasures are few and are sadly and soberly indulged in.

The reasons for so few of the Indian Medical Service making a special study of the structure and classification of the Flora around them, are, we believe, firstly, the fact that books on the Indian Flora are rare and expensive ; again, that improved communications have put an end to the easy, slow saunter through the country that marked the young Assistant Surgeon's progress from station to station a few years ago, when the varying features of the plants by the way-side, almost of necessity, arrested his attention ; and thirdly, that this kind of knowledge has no substantial charms to render its cultivation directly or indirectly lucrative.

With regard to the first prohibitive reason, the scarcity and costliness of books treating of the Indian vegetable kingdom, Colonel Heber Drury has done his best to cause this to disappear.

In 1864, the first volume of his "*Hand-book of the Indian Flora, being a guide to all the Flowering Plants hitherto described as indigenous to the continent of India,*" was issued from the Travancore Sirkar Press, and during the present year it has been succeeded by a second volume, plain homely-looking tomes, owing nothing to the printer's art, but intrinsically excellent and useful exceedingly.

The work is, of course, a compilation, and such a compilation as was urgently required, drawing its materials from upwards of sixty different sources, some of which are only to be found on the shelves of the wealthy and luxurious votaries of science, and some not procurable even by the most diligent and prodigal of Book-Hunters.

In the first volume Colonel Drury's labours were much lightened by the precious fragment, volume 1st of Wight and Arnott's Prodromus, being ready to his hand, which carries the reader pleasantly and profitably to the 83rd order—*Dipsaceæ.* The 1st volume now before us (Drury) ends similarly with *Dipsaceæ,* and, besides containing notices of all the plants nominated in his bond (between Ranunculaceæ and the above mentioned order), it furnishes an admirably clear and simple glossary of Botanical terms used in the work, and indices of synonyms in the Tamil, Malayalim, Telugu, and Hindoostanee and Bengalee languages, besides a general index of names.

If Botany is ever to be made a popular science in India, we hold that it must be rendered so by the publication of vernacular indices of local Floras. This method of acquiring Botany was despised by such giants as Wallich and Carey, the latter of them said of the supposed native names given to De Candolle and Jussieu by Leschenault, along with the specimens collected by him in the southern parts of the Peninsula: "they are, in general, a mere burlesque on names, "meaning often that the natives *had no name for the* "*plant, or did not know it:* in other instances, it appears "to have been not the name of the plant, but the name "of the village near which it was found, which had been "marked down." Which last shows that Leschenault must have been very ignorant of the language of the district he was operating in, but is no argument against vernacular indices in general, so long as the native nomenclature can be checked by the collector's knowledge, however slight, of the vernacular of the locality.

For our own part we feel under great obligations to these native names of plants, they led us to commence the study of Botany, and, though they often led us wrong as we groped through the portals of the science, still the act of correction of the blunders helped us on our way.

It is provoking to find that a score of plants *Asclepiadiaceæ* and *Euphorbiaceæ* are known by the common convenient name of *Doodhee,* but a very slight knowledge of Hindustani suffices to show us that that name has reference solely to the *Doodh,* the milky juice with which such plants abound.

To the beginner the assistance given by native names is very great, to others than beginners this aid may be a matter of indifference, but we think most Indian Botanists, as we said above, begin in India.

This Col. Drury says of himself in the dedication of his "*Useful Plants of India*" to General Cullen, and this too is said of Voight, the author of the *Hortus Suburbanus Calcuttensis,* whom fortune led to the splendid botanical garden of Serampore, the work of Dr. Carey's long and useful life-time.

Let all lovers of plants, we say, draw up vernacular indices of the Flora of their particular scene of operations, they will by the publication of these do genuine service to Botany, they will render easy the labours of their successors, and they may even induce natives to acquire and cultivate the science.

The Rev. Mr. Gell, in the preface to his useful little "*Hand-Book, or Catalogue of native names of trees and plants in the jungles of Western India,*" says "By natives of India alone can Botanical science be pursued in India with the same success which has attended the efforts in this direction of Europeans in Europe. Few of us have the leisure, fewer still the mental and bodily qualifications which must be combined, before the Botany of India is mastered. By 9 or 10 o'clock in the day, when an English Botanist is just warming to his day's work, the Anglo-Indian sinks in unconquerable langour, even if dim sight and reeling brain do not warn him to desist from further exposure to a sun which is stronger than he." Field Botany in India is trying indeed, but not more so than Shikar. Now Sportsmen count by the thousand, but Botanists only by the tens, we are afraid.

Dim sight and reeling brain do not affect us much, as we splash through the rushes in pursuit of *Gallinago Scolopacinus,* then why should they do so as we peer through the gloom of thicket and forest for flower and fruit and leaf?

The fact is that the best time for the Botanist is in and immediately after the rains, when malaria at his feet and Dan Phœbus above his head are in the glow and fierceness of their malignant strength.

The Botanist who jots down native names for plants will often be struck with the evidence of the close and excellent powers of observation of natives, as displayed by their grouping together, plants that at first sight seem very dissimilar.

Thus there is nothing striking to a casual observer in the appearances of the two plants *Evolvulus Alsinoides* and *Cressa Cretica;* they are found often close together in the same kind of soil; they bloom at the same season, and examination shows us that they both belong to the natural order *Convolvulaceæ.* But in the North-west Provinces their relationship is recognized by the natives who call the first *Chotee* and the second *Burree Sunkahoolee.* This is but a solitary instance of the diagnostic instinct we have had occasion to notice and wonder at in natives scores of times.

The notices of plants in Col. Drury's two volumes are brief to baldness, but his field is immense and his space is scant, *ars longa, vita brevis est,* and, had he emulated the copiousness of old Roxburgh, his volumes might have counted by the dozen, whereas we believe that his task will be ended in the completion of his 3rd volume, soon, we hope, to appear.

His method is excellent, each plant being described under three or four heads. Firstly, we find the ORDER briefly and clearly described. Then the GENUS, with its classification according to the Linnæan system. Then the derivations are given (for which we must all thank him, they being often amazingly remote and far-fetched). Then come the general characters of the GENUS.

Now come the VARIETIES, each one under four heads; its identification, with the page and volume of the authority cited; the engravings extant that illustrate it; its specific characters; its habit at and season of flowering.

We said above that the first volume concluded with *Dipsa-*

ceæ. Vol. II. begins with the 88th order or *Compositæ,* and ends with the 124th order or *Plantaginaceæ.*

In the compilation of this second volume Col. Drury had no Wight and Arnott's Prodromus to assist him, and he confesses that the 36 natural orders comprised in the volume have required a far greater amount of labour than the first volume called for.

Roxburgh, Wallich, Rheede, Graham, Wight's Icones, Dalzell, Hooker, and others have been largely drawn upon in this second volume, and the product is most valuable, more so perhaps than the first volume, which the *Prodromus* had forestalled.

This second volume, like the first, concludes with the vernacular indices we so especially thank the author for giving us.

Nearly one hundred pages are devoted to *Acanthaceæ.* Let us dip into them, and take out one variety, to show the reader the author's method.

Genus xxxiii. ASTERACANTHA.

Didynamia Angiosperma, Sex. Syst.

Deriv.—Nom. *Aster,* a star, and *Acanthus,* a spine ; alluding to the whorl of spines round the flowers.

After an enumeration of the general characters, he takes us to the variety :—

"(1) A. LONGIFOLIA. (*Nees.*)

"*Ident.* N. ab. E. in Wall. Plant. As. Rar. III. p. 90. Dec. Prod. xi. p. 247.

"*Syn.* Barleria Longifolia, *Linn.* Ruellia Longifolia, *Roxb.*

"*Engrav.* Wight's Icones, t. 449, Rheede Mal. ii. t. 45.

"SPEC. CHAR. Herbaceous, erect: stem quadrangular leaves lanceolate, attenuated at both ends, serrulate, ciliated flowers sessile in the axils, verticilled, blue, surrounded by rigid spines.

"In swampy places, very common, flowering in the rainy season."

There are only two things essentially wanting in this description, and these may be found in the author's "Useful Plants of India"—which every one of our readers *ought to* have on his shelves if he have it not already,—we allude to the vernacular name, and the use of the plant.

In concluding our notice of these two volumes of "*The Hand-book of the Indian Flora,*" we must not do so without giving them our unqualified praise, and with the expression, not only of our gratitude to the author, whose task has been one of immense labour, but also of our pleasure and pride that Madras still appears, as she has ever done, in the van of Indian Botanists. Madras, though shockingly behind the world, in that it has stood aloof from the amazing commercial rascality that has prevailed in her more busy sister Presidencies, is wide awake to the interests of science, and can boast of more æsthetically noble reclamations than those of Back Bays and its kindred burst-up bubbles.

The second work on our list is a new development of the excellent "Maunder," whose neat and handy little volumes are as popular generally as the famous Churchill series of manuals are in the Medical profession.

The Treasury of Botany, in its progress from A. AARON'S BEARD, *Hypericum Calycinum,* to Z. ZYGOSTIGMA, occupies 1254 pages, double columned, in small legible type, divided into two volumes, profusely illustrated, and is one of the prettiest little hand-books ever issued from the London Press.

This work had originally been undertaken by the late Dr. Lindley, Emeritus Professor of Botany in University College, London ; and the well-known author of "The Vegetable Kingdom," but, owing to his protracted illness, and much to be lamented death, the book passed out of his hands when the letter C had been reached, and thenceforward was conducted to its conclusion by Mr. T. Moore, Curator of the Chelsea Botanic Garden, as Editor, assisted by a staff comprising some of the most honored names in Botany, such as those of Professor Balfour, Dr. Seeman, Mr. J. T. Syme, and the Rev. M. J. Berkeley.

The initials of each member of the editorial staff are appended to the several articles, and when no initials are found, it is to be concluded that the article is by the editor, Mr. T. Moore, himself.

It is profusely illustrated with woodcuts by Fitch, the illustrator of Bentham's English Flora,—as familiar a name to Botanical students as is that of Bagg to readers of Churchill's Manuals,—and by series of steel engravings, which, al-

though very pretty, might have been left out without disadvantage, whilst their absence might have cheapened the book.

Thus plate 18, representing the Hyphæne or Doum Palm in Upper Egypt, was scarcely required, seeing that the characters of the tree were already most plainly figured in a wood-cut on the opposite page.

The share of steel-plates that falls to India is confined to plate 1, which represents Epiphytal Rhododendrons of the Himalayah, typified in *Rhododendron Dalhousie*, whose introduction into England was owing to the labours of J. D. Hooker.

It is described as "a slender straggling shrub, six to eight "feet high, with oblong leaves, and white bell-shaped fra- "grant flowers, with a delicate rosy tinge. It is generally "growing, like many tropical orchids, amongst moss, with "Ferns and Aroideæ, upon the limbs of large trees, at from "6,000 to 9,000 feet above the sea, in a region of fogs, "moisture and rain, in sight of the snow-capped peaks of "the Himalayahs."

Another plate (No. 12) represents the vegetation of the Cinchona Forests of Peru, with Palms and Tree Ferns, and affords a peep of delicious scenery in the valley of San Juan del Oro, deep amongst the spurs of the Cordillera, that were once famous for their gold-washing. In these lovely Caravayan valleys, at an altitude of 5,000 feet above sea level, Mr. Clement Markham made that collection of Cinchona plants that was destined to clothe our Nilghiri Hills with a new and unspeakably valuable Flora, and to rescue the Quinine-bearing Cinchonaceæ from the destruction wrought by the reckless and improvident greed of ignorant Cascarilleros.

In the forests of Bolivia and Peru the Cinchona trees, growing in groups and clusters, are almost unapproachable owing to the extraordinary denseness of the protecting jungle. The experienced eye of the Cascarillero detects his prize from afar off, owing to a peculiar movement of its leaves, and by the colour of the masses of bloom, and after struggling through the intervening masses of jungle he fells the giant of the forest, and stripping off the bark nearest to his hand proceeds to look out for another victim.

In this process the trees are necessarily at once destroyed, when by pruning any quantity of bark could be obtained,

and the tree be left vigorous and capable of many subsequent spoliations; and thus it was that there seemed to be a chance of Cinchona passing away in process of time, and ourselves being left forlorn and quinine-less. Thanks, however, to Lord Dalhousie, to Markham, and especially to Mr. MacIvor, the able guardian of the bark plantations at Ootacamund, there seems to be, *now*, every chance of Jesuit's bark being naturalized on our glorious Hill ranges, and quinine brought within the reach of every body vexed of that devil '*Malaria.*'

At the same time that Cinchona is succeeding so admirably on the Blue Mountains, it is in equally flourishing condition on the higher mountains of Jamaica, and, we believe, also on the mountain-ranges of Java. We are not aware whether its cultivation has been attempted on the noble table-lands of Southern Africa, in Natal for instance, at present. In the last-mentioned country there are glorious tracts of country, healthy and well-watered, 3,000 feet above the sea level, which seem to invite its introduction.

It is difficult to know whence to glean a few descriptions from the "*Treasury of Botany*" which may give our readers an idea of the scope and style of the work.

We look out from our own Bungalow, and in the compound we find a tree bursting into blossom and delicious fragrance, that we may as well select for quotation. It is the *Millingtonia Hortensis*; let us see what Maunder says of this lovely ornament of our Indian gardens.

"MILLINGTONIA *Hortensis* is the only representative of a bignoniaceous genus, peculiar on account of its combining an arboreous habit with a fruit divided into two cells, by means of a partition running parallel with the direction of the valves. *Millingtonia* is a middle-sized tree, with impari-bipinnate leaves, quite entire leaflets, and large panicles of white flowers, emitting a delicious odour, on account of which the plant is cultivated in many parts of India and the Indian Archipelago. The calyx is bell-shaped, and with five equal and short lobes; the corolla has a very long tube, and is divided into five lobes, the two uppermost of which are more or less grown together; the stamens are four in number, and the anthers not divergent, as in most *Bignoniaceæ*, but parallel; both stamens and style are longer than the corolla, whilst

the fruit is a smooth flat capsule, enclosing broadly-winged seeds. Several other species formerly classed under *Millingtonia* have now more properly been referred to other genera of *Bignoniaceæ.*"

For comparison sake let us turn to "Drury's Indian Flora," and see how he treats the same tree.

"Genus iii. MILLINGTONIA.

Didynamia angiospermia, Sex. Syst.

Deriv. In honour of Thomas Millington, an English Botanist and Author.

(1) M. Hortensis (*Linn.*)

Ident. Linn. f. Suppl. p. 291. Dec. Prod. ix. p. 182.

Syn. Bignonia Azedarachta, *Koen.* B. Suberosa. Roxb. *Flor. Ind.* iii. p. 111.

Engravings. Roxb. Cor. iii. t. 214.

SPEC. CHAR. Tree; leaves opposite, bipinnate with an odd one, leaflets entire, panicle large, oppositely-branched, many flowered: flowers white, fragrant.

Said to be a native of Ajmere, flowering in the cold season."

This beautiful tree grows in perfection in Malwa, and in October, November, and December is covered with the most beautiful wax-like bloom that scents all the air around. But it *never* seeds. Its roots throw up young shoots that are detached by the Mâlees, and grow very readily on removal from the parent tree. But the lovely milk-white bloom falls barren from the tree and strews the ground beneath with a carpet of perfumed beauty. This dehiscence sometimes takes place so soon as the flower expands into perfection and before the dehiscence of the anther can take place so as to fertilize the ovules within the immature ovary.

Many flowers fall before expansion of the border, in which cases their falling is owing to a breaking of the peduncle just as it joins the calyx, and upon close examination it is seen that at the point of fracture a ring of strands of white fibre has been broken across, after which the corolla has fallen of its own weight.

The Treasury of Botany does not disdain the introduction of vernacular names. Thus we find next to "KAKOON, an

Indian name for Setaria Italica;" "KALADANA, *Pharbitis Nil.*" "BABOOL, the Indian name for the gum-bearing *Acacia Arabica.*" "MUDAR, *Calotropis gigantea*, and *C. procera.*" "MUHOOA or MUOHWA, an Indian name for *Bassia latifolia.*" "AKHROAT, INDIAN, *Aleurites triloba.*"

It will be seen from the specimen descriptions cited above that "The Treasury of Botany" is intended to fulfil the purpose of a popular manual, giving brief and easy notices of the most noted, useful, and conspicuous members of the Flora of the world. It does not aim at more, and certainly, as far as it goes, it is unexceptionably good of its kind.

It is contributed to by eminent men who know what they write about, and how to write, and how to condense without becoming obscure. For the sportsman who wishes to know something of the forest and jungle in which he seeks his quarry, it will prove most useful and entertaining, and should accompany him in all his shikar trips, balancing the sister volume on Natural History, revised and corrected by Dr. Spencer Cobbold. To those who form the bulk of our readers we can recommend "The Treasury" strongly, for we think it may make many of them dip into Botany, and, growing fascinated, yield themselves prisoners to Flora who neglected her before, and to whom the vegetable world was as the primrose to Wordsworth's peasant—

"A primrose by the river's brim,
A yellow primrose was to him,
And it was nothing more."

On the Curability of Certain forms of Insanity, Epilepsy, Catalepsy, and Hysteria in Females. By BAKER BROWN, F. R. C. S., Senior Surgeon to the London Surgical Home, &c. &c. London: ROBT. HARDWICKE, 1866, Small 8vo., pp. 85.

IN all probability the majority of our readers have become acquainted, through the medium of the English Medical Journals, with Mr. Baker Brown's views and practice as set forth in the above-named work. If not, a very few extracts will suffice to exhibit them.

"Long and frequent observation convinced me that a large number of affections peculiar to females, depended on loss of nerve power, and that this was produced by peripheral irritation, arising originally in some branches of the pudic nerve, more particularly the incident nerve supplying the clitoris, and sometimes the small branches which supply the vagina, perinæum, and anus.

"Closer observation satisfied me that the greater or less severity of the functional affections observed, depended upon the amount and length of irritation, and the consequent amount of loss of nerve power.

"Nor are functional disorders the only consequence, but in some cases, severe organic lesions." Page 7.

The cause having been found, then,—"peripheral irritation of the incident nerve supplying the clitoris"—the cure is as follows:—

"The patient having been placed *completely* under the influence of chloroform, the clitoris is freely excised either by scissors or knife—I always prefer the scissors. The wound is then firmly plugged with graduated compresses of lint and a pad, well secured by a T bandage.

"A grain of opium is introduced per rectum, the patient placed in bed, and most carefully watched by a nurse, to prevent hæmorrhage by any disturbance of the dressing. The neglect of this precaution will be frequently followed by alarming hæmorrhage, and consequent injurious results.

"The diet must be unstimulating, and consist of milk, farinaceous food, fish, and occasionally chicken; all alcoholic or fermented liquors being strictly prohibited. The strictest quiet must be enjoined, and the attention of relatives, if possible, avoided, so that the moral influence of medical attendant and nurse may be uninterruptedly maintained." Page 17.

Mr. Brown says that he always makes a point of having his diagnosis confirmed by the patient or her friends; but:—

"On personal examination, the peculiar straight and coarse hirsute growth; the depression in the centre of the perinæum; the peculiar follicular secretion; the alteration of structure of the parts, mucous membrane taking on the character of skin; and muscle having become hypertrophied and generally tending towards a fibrous or cartilaginous degeneration; will all be recognized by the practitioner who has once had his attention drawn to these subjects." Page 16.

The author says that he has, for the last six or seven years, openly and consistently advocated this "effectual

method." That he has been met with many objections, such as :—

"Unsexing the female, preventing the normal excitement consequent on marital intercourse, or actually, as some most absurdly and unphilosophically assert, causing sterility; whereas my cases will show fact to be directly converse to all these theories. * * *

"Another objection has been made that several of my cases have not been permanently cured, but have had relapses in a few weeks or months. This must necessarily be so with all new methods of treatment; but each such case is of incalculable importance, as teaching me to exclude any but temporary hope of relief to some, while to others I can speak all the more positively as to their ultimate permanent recovery." Pages 9, 10.

We must acknowledge that we do not quite appreciate the logic of the last sentence, nor do we exactly understand what Mr. Brown means by a "temporary hope."

"Lastly, objections have been advanced against the morality of the operation, and I am here at a loss how to give an answer, for I can hardly conceive how such a question can be raised against a method of treatment which has for its object the cure of a disease, that is rapidly tending to lower the moral tone, and which treatment is dictated by the loftiest and most moral considerations." Page 12.

Mr. Brown tells us that the following gentlemen adopt his views and treatment in proper cases :—

"Sir J. Simpson; Dr. Beattie, of Dublin; Sir J. Fife and Dr. Dawson, of Newcastle-on-Tyne; Dr. Duke, late of Chichester; Dr. Shettle, of Shaftesbury; John Harrison, Esq., of Chester; Drs. Savage, Routh, and Rogers in London; Mr. Boyer Brown, New South Wales; Dr. Barratt, and Messrs. Harper, Chambers, J. B. Brown, Junior, and Bantock, of the London Surgical Home, and very many others." Page 13.

As to the length of time over which the "cure" extends, our author says :—

"A month is generally required for perfect healing of the wound, at the end of which time it is difficult for the uninformed, or non-medical, to discover any trace of an operation.

"The rapid improvement of the patient immediately after removal of the source of irritation is most marked, first in the countenance, and soon afterwards by improved digestion and other evidences of healthy assimilation.

"It cannot be too often repeated, that this improvement can only be made permanent, in many cases, by careful watching and moral training on the part of both patient and friends.

"In the large majority of cases, I have administered no medicines, trusting entirely to recovery, after the removal of the source of irritation. Sometimes, however, we may be materially aided by the use of such medicines as the bromides of potassium and ammonium, belladonna, &c." Page 18.

Mr. Brown gives details of a great number of cases, we do not know whether they are selected ones, or whether all the instances of excision of the clitoris performed at the "London Surgical Home" are reported. We have just run through the list in order to compare the cures with the failures, and find the result as follows :

Diseases.	*No. of Cases.*	*Failures.*	*Remarks.*
Hysteria.....................	14	1	"A regular impostor."
Spinal Irritation	7	0	In one, no "cure" reported, but "rapid improvement."
Epileptoid Convulsions or Hysterical Epilepsy.	7	0	
Cataleptic Fits	5	1	Relieved.
Epilepsy*	8	1	do.
Idiotcy (*sic*) and Insanity	7	1	Relief, but no permanent cure.

We have gone over the cases a second time to ascertain at how remote a period after operation, Mr. Brown has been able to furnish any account of those patients whom he reports as "cured," and we find the results as follows :—

Of the thirteen cases of *Hysteria* cured, the reports embrace in 1 case, a period of 13 days ; in 1, 21 days ; in 1, 26 days ; in 2, 30 days ; in 1, 48 days ; in 2, 2 years ; in 2, 3 years ; in 1, 4 years ; in 1, 5 years ; and 1 uncertain.

Of the seven cases of *Spinal Irritation* cured, the reports embrace in 1 case, a period of 7 weeks ; in 1, 6 months ; in 1, 7 months ; in 1, over 2 years ; in 1, 3 years ; (this patient was cured of amaurosis, and Mr. Brown says "I have had other cases exactly similar, with like results"); and in 2, uncertain, about 4 years apparently.

* Mr. Brown says at the conclusion of the chapter on Epilepsy :—"I have a much larger number of cases occurring in private practice, but, for that reason, am obliged to omit them. I shall, however, when a longer time has elapsed, publish them."

Of the seven cases of *Hysterical Epilepsy* cured, in 1 case the reports embrace a period of 25 days; in 5, about 6 weeks; in 1, 5¼ years.

Of the four cases of *Cataleptic Fits* cured, the reports embrace in 1 case, a period of 5 weeks; in 1, several weeks; in 1, 6 months; and in 1, 5 years.

Of the seven cases of *Epilepsy* cured, the reports extend in 1 case over a period of 2 months; in 1, some time; in 1, many months; in 1, 1 year; in 2, 2 years; and 1 uncertain, said to have been cured in a month and to have been heard of "later in the year."

Of the six cases of *Idiocy and Insanity* cured, the reports embrace the following periods. In 1 case, many weeks; in 1, 15 months; in 2, over 2 years; in 2, 4 years.

Mr. Baker Brown must excuse our saying that in many of the above cases, sufficiently long periods have not elapsed to enable him to speak as to the permanency of the cure. From his *Hysteria* series we would eliminate the seven cases under observation less than seven weeks; and from the *Spinal Irritation* series, the three of which no reports are given after seven months. In fact, with regard to the whole of these cases, we would ask our author whether it is not possible that a thorough perseverance in the "milder treatment with careful watching," which he finds sufficient in patients under ten years of age, would not have effected a cure? We would have placed all the *Spinal Irritation* cases under the head of *Hysteria*; and we firmly believe that they might have been cured without any resort to what Mr. Brown designates as "my usual operation." We have seen very many such cases, and we feel certain that *tact* is far more effectual than *talent* in their cure.

We remember a remarkable case. A young lady, about 20 years of age, had been confined to her couch with "spinal affection" for several years, and had "suffered many things of many physicians." At last a 'cute friend of ours was consulted, and, detecting hysteria as a large element in the case, he said at once;—"Now, Miss—, I have paid you the promised visit, but as my time is very much occupied, I am sorry to say I cannot call again, but I shall be happy to see you at my house at 3 o'clock next Wednesday." The young lady excitedly declared the utter impossibility of her moving; but, nevertheless, she walked into our

friend's consulting roo
appointed day!

Within the last few
woman who detailed
had suffered for a long
simulated morbus coxæ
the femur was rotated
she could not flex the l
stand without support.
placebo only, but on th
complaints were very p
in her hearing, to have
tion the following day.
about without aid, and
she was very much bet
days: and her prophecy
have seen so many such
that Mr. Baker Brown
line of treatment, so fa
are concerned.

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head of *Hysteria*; and
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unusual for several year
even in a person who ha

very short intervals. Romberg* says:—"Occasionally the intervals in Epilepsy are much protracted, the physician therefore should exercise much caution in prognosticating a permanent recovery." And he mentions one case in which daily recurring fits were followed by an interval of two years, when they again made their appearance; and another case in which the disease remained in abeyance for twenty years and then broke out with increased intensity.

None of Mr. Brown's cases of Epilepsy appear to have been within his knowledge for a longer period than two years. So that again we say the "cures" are by no means indisputable. And, generally, as regards the treatment, Mr. Brown must be reminded that Esquirol and others have observed that *a change of the physician and of treatment* may prolong the intervals and even give rise to a pause.

In thinking seriously over Mr. Brown's practice, it must be remembered that Epilepsy is as frequent in the male as in the female; indeed Celsus, Heberden, Soemmerring, Cooke, and Cheyne, say that the preponderance, in true Epilepsy, is on the side of the males.† Elliotson says the disease is more common in males; and Watson‡ says, "I have certainly seen more epileptic boys and men than girls and women." It is but right though to mention that the experience of Foville and others is opposed to this view. However, we must recognize the fact that sex has but little, if any, influence on the disease.

Almost all writers on Epilepsy acknowledge that, although the remote cause of the disease must be in the brain, the peripheral irritation which onanism sets up may be an exciting cause, in either sex. And we therefore think there was some pertinence in the question put to Mr. Brown, in one of the London Medical Journals, whether he is prepared to put in practice on the male, the corresponding operation to that which he finds so effectual in the female?

As regards the *Idiocy and Insanity* cases, we would ask Mr. Brown whether he seriously believes that by simply

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* Diseases of the Nervous System: Sydenham Society, 1853, volume ii. page 218.

† Copland's Dictionary of Medicine. Art. Epilepsy.

‡ Lectures on the Theory and Practice of Physic, 3rd edition, volume i. page 638.

excising the clitoris he has a
Insane person ?

Mr. Brown has been very f
lisher; the book is very neatl
is always the case with any
wicke's name on its title pag

Report on Vaccination, thi
Provinces of Madras, i
Authority. Madras : Pi
Co., 1866. 8vo. Pages

Mr. Shaw, the Principal Insp
ment, introduces the Repo
Superintendent of Vaccinati
make the following extracts :

"During the year 1865 many
partment. The number of vaccina
and those remaining in the de
professional supervision. As n
a period of change, there has b
operations, as
been perforn
for the perio

1864 ..... 311, 587.
1865...... 191, 394.

been completed are, however, so
inclined to the belief, that more
reduced establishment, under eff
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excess.

* *

"The ready way in which
Districts seek for medical aid, at
tendents of Vaccination, affords ev
ally there will be less difficult
people. I beg to recommend, f
Government, the proposition to
season, with each Superintenden
of sufficient size, to enable the
relief in important cases.

* *

I have no doubt whatever t

vaccinators will be necessary when the present establishment is complete and in working order. Something has already been done by Dr. Shortt in pressing upon Zemindars and other owners of landed property, the importance of their keeping up vaccinators on their estates at their own cost. The appeal has been so far responded to that thirty-one vaccinators are now maintained in various parts of the country, at the private expense of their employers.

"The number of large landed proprietors in this Presidency however is so small, that I do not expect much material help from this source.

"In Bombay, I observe, that a beginning has been made by the Local Municipal Associations in extending vaccination, by means of vaccinators locally entertained. I do not see why a similar practice should not be introduced in this Presidency also, so that the Government vaccinators might the better pursue their functions elsewhere."

The above extracts will save us from doing more than just glancing at the report itself.

Under the present organization, the Madras Vaccination Department comprises :—

1 General Superintendent.

11 Deputy Superintendents (selected, with one exception, from the ranks of the Subordinate Medical Department, and all bearing the title of Sub-Assistant Surgeon).

145 Vaccinators, and

25 Peons.

So that there is 1 Deputy Superintendent, and 13 or 14 Vaccinators, to every two Collectorates in the Presidency.

The percentage of success of the vaccinations performed during the year varies from 70·13, in the Madura Circle, to 96·05, in the North Arcot Circle, the average being 87·04.

Dr. Shortt remarks with reference to the decrease of 120,193 vaccinations in 1865, on the numbers reported as vaccinated in 1864, that during the greater part of the first six months of 1865, the work was at a stand-still in many districts and irregularly conducted in others, owing to the department being in a transitional state ; and that the greater trustworthiness of the work performed during the second half of 1865 counterbalances that of the previous eighteen months, which, for the greater part, is untrustworthy.

We think this statement shows that the reorganization

of the department has not been effected a day too soon.

Upon referring to the tables we find that during the fir six months of 1865 the number of cases *reported* to hav been vaccinated was 95,721, with a success of 88·35 p cent., and the number of actual vaccinations in the secon half of the year was 95,673, with a percentage of success 81·13.

Bearing in mind that the new organization can only b said to have been complete during the last quarter of th year, we think every one concerned either in originating or in carrying it out, may be congratulated upon its promi of success.

Dr. Shortt enters upon several interesting points in hi report, which we have not space to enlarge upon. He re marks upon "the alleged degeneracy of vaccine lymph, and reports that the experience of the department does no support the degeneracy theory. He has experimentall proved, however, what Dr. Husband also observed, "tha lymph preserved in glass tubes when first used generally pas ses through its several stages either prematurely, the fifth o sixth day vesicles showing the character of those of th eighth and tenth days, or the areola is sometimes covere with small vesications. Notwithstanding this, the lymp when transferred to other subjects, produces the genuine dis ease in its true pristine character." He also remarks upo the mode of operating, the best kind of instrument, th number of punctures, &c.

The zealous Superintendent is a strong "protectionist, and urges that vaccination should be made compulsor He remarks that even in Great Britain and in every Europea nation, the people are compelled to submit to vaccination o behalf of the public weal. "And that British India, when surrounded as we are by indifference and ignorance, shoul form an exception to compulsory vaccination, to suit an prejudice which is believed to exist in the native mind, an which I believe to be a mere myth, is surprising; and th public at large should not be made to suffer."

We quite agree with Dr. Shortt, and trust that ou period of service in the tropics will not have expired, befo not only a Compulsory Vaccination Act, but also a Diseas Prevention Act, shall have been passed by the several In dian Legislative Councils. It cannot be too strongly urg

that *preventible diseases should be prevented.* The law punishes a would-be suicide: why should it take no cognizance of wholesale destruction of life. Is it on the principle that "to kill one man makes a murderer, but to kill a thousand makes either a hero or a physician?"

Copious extracts from the Reports of the District Superintendents are given, and the results are conveniently tabulated so as to show at a glance the operations of the Department during the year. The order of Government on the Report will be found in the MEDICAL INTELLIGENCE.

A Hand-book of the Trees, Shrubs, and Herbaceous Plants growing in the Madras Agri-Horticultural Society's Gardens and Neighbourhood of Madras. Arranged according to the Natural System. By ROBT. N. BROWN, late Superintendent of the Agri-Horticultural Society's Gardens, Madras. Second edition, carefully revised. With a Supplement by J. J. WOOD, Assistant to the Professor of Botany, Medical College. Madras: J. HIGGINBOTHAM. 1866, 8vo. pages 303.

THE following extract from Mr. Wood's preface will show the scope and object of the above work:—

"There are probably many in Madras, pursuing the study of Botany, whose business will seldom or never take them into the Mofussil; these are the parties to whom something of an approach to a *local* Flora, such as this is, would, at any time, be a great boon. With the exception of the mere elements of the study, Botany must necessarily be a sealed book to, at least, some of them; since most of the works from which any knowledge of the plants around them could be obtained, are, comparatively, very rare, in great request, and, therefore, very expensive.

"The want in Madras of such a work as this (though little more than a catalogue) may be said to be proved by the ready sale which the First Edition met with.

"It is in no way presumed that the supplement at the end of the book completes the Flora of Madras and its neighbourhood. To include in this manual most of the plants growing, or reported to be found in Madras, would amount to nothing less than the com-

piling of a Flora of the Coromandel. We have simply added such plants found here, as we considered important, and which were not included in the First Edition."

With all deference to Mr. Wood, we think that he takes far too modest a view of the character of the work he has edited; we cannot believe that its use is necessarily so very limited and restricted as he supposes. Upon looking over the pages, we find that there is quite sufficient information given to enable any person, interested in horticulture and with an elementary knowledge of Botany, to determine the species of plants and shrubs, and as the majority of those described are not peculiar to Madras alone, Mofussil Floriculturists may find the book an aid to them.

Mr. Wood also writes of the work as a mere Catalogue. We do not agree with him, for we find a *description* and an account of the *distribution* and *properties* of each order of plants noticed, and there is a very useful feature in the book, which might be imitated with great advantage in other botanical works: viz., the derivation and meaning of the names of genera are given (so far as we have ascertained) in every instance. We say this is a useful feature, because names with which one is unfamiliar are much better remembered when their exact meaning is known, and it is not every one who has his classics at his tongue's end ready to furnish him with the requisite information. Moreover compounds of two or more Greek or Latin words are not always recognized as to their origin when heard for the first time. For instance who would recognize at first glance "Acacia, from *ac*, a point, and *akazo*, to sharpen, many of the species having thorns or prickles:" or "Sapindus, from *sapo*, *Indicus*;" or "Nauclea, from *naus*, a ship, and *kleio*, to inclose; the half capsule is hull-shaped;" or "Ipomœa from *ips*, bindweed, and *homoios*, similar." Further than this it is not always that these generic titles are derived from the Greek or Latin, for very many of them are simply the latinized names of distinguished Botanists or Philosophers as Griffithia (Griffith), Leea (Lee), Poivrea (Poivre), Lagerstrœmia (Lagerstrœm), &c. And other generic names are mere modifications of those given to the trees or plants by the inhabitants of the countries from whence first obtained as Mussænda, Nelumbium, (Singhalese); Guazuma (Mexican); Moringa, Pongamia, Cajanus (Malabar); Agati (Sanskrit); Rosa (Celtic); Macuna (Brazilian); &c.

The book is furnished with a copious index of both the Botanical and English names.

The Editor's labours have not been confined merely to the production of the supplement, but the whole text has been most carefully corrected.

The typography and general appearance of the book are alone sufficient to indicate a colonial origin; but in all probability the prospect of a somewhat limited demand, and the necessity for the price being very moderate, have proved such "urgent financial considerations" to the spirited publisher as to induce him to sacrifice mere appearances to utility. We hope that a speedy sale of this second edition will follow as the due reward of Mr. Higginbotham's enterprize.

Report on a Project for the Drainage of the Town of Madras. By Captain HECTOR TULLOCH, Royal Engineers. Madras: GANTZ BROTHERS, 1865. Crown 8vo. pp. 120.

WE have perused and reperused this Report very carefully, and have much pleasure in introducing it to the notice of our readers; for on attentive consideration it will be seen that it is in reality not merely a project for the drainage of Madras, but is also suggestive as to the disposal of the sewage of any town in India.

Captain Tulloch concludes some introductory remarks with the following paragraph which will show the scope of his report:

"A knowledge of the natural position and features of a town is so indispensable when the question of its drainage is to be considered, that a description of the more important physical characteristics of Madras will form the first part of this report. The general condition of the inhabitants, *i.e.* the number and density of the population, the construction and arrangement of the dwellings, the present means of water-supply and drainage, &c. will next be treated of. Without this information no opinion could well be formed on the suitableness of the project to the requirements of the town. The system of 'Dry Conservancy' which has attracted so much attention lately, will next be discussed. I shall then endeavour to meet the 'Objections to Sewers' which are occasionally urged, in consequence

of the favour with which dry conservancy has been received. The rest of this Report will be confined to an explanation of the project now submitted to Government, and to questions incidentally arising out of it."

We purpose noticing here the principal points only to which Capt. Tulloch calls attention. The Report itself is so condensed and so freed from all unnecessary "talk," that if we were anxious to show all that its author has done, we should have to reproduce it entire. That Captain Tulloch has most thoroughly gone into every circumstance that could in the least influence his project, may be known by the fact that he has himself superintended the taking of levels and the making of borings over the whole district which he proposes to drain. He shows that the area of the tract of *Madras Proper* may be taken at 27 square miles.

"The strata in parts consist almost entirely of sand, but generally of alternate layers of sand and clay. There is no rock to be found except at a considerable depth below the surface, a depth which none of the sewers which it is proposed to lay down will approach. The town stands on a sandy plain—the lowest parts being from 2 to 6 feet, and the highest from 16 to 24 feet, above mean sea level. The average level of the whole of Madras may be taken at from 8 to 12 feet above the datum line. Water is found in all parts at a few feet above or below mean sea level. * * * There is no natural line of drainage for the Town of Madras, *considered as a whole*. This is an important point, and one of the truth of which it will be well to be convinced by a reference to the map of Madras which accompanies this Report. Each district, however, has its ridges and valleys which can be turned to account when we take it *by itself*, and lay down its branch-sewers and pipe-drains irrespective of the other neighbourhoods."

Madras may be conveniently divided into four drainage divisions.

1. The districts of Royapoorum and Tondiarpett, lying north of the Railway, between Cochrane's Canal and the sea; thickly populated in its southern portion only. A ridge half a mile broad and from 12 to 15 feet above mean sea level runs north and south through the centre of the district, and slopes both east and west.

2. Bounded by the Railway on the north, the Canal on the west, the Cooum on the south, and the Sea on the east. It contains Black Town and Fort St. George. There are two parallel ridges running north and south from 12 to 21 feet

above datum line, and having an intervening valley, 6 to 8 feet above datum line; this valley is in Popham's Broadway. "Of all the districts of Madras, Black Town offers the greatest facilities for drainage."

3. Vepery, Pursewakum, Egmore, and Elemboor, bounded on the south by the Cooum, on the east by the Canal, on the north by Captain Cotton's Canal, and on the west by Chetpet, Kilpauk and Perambore. This division is somewhat difficult to drain.

4. The district south of the Cooum, containing Chintadrapett, Triplicane and St. Thomé. It is very irregular but presents no important feature.

The natural drainage outfalls of Madras are the rivers Cooum and Adyar, Cochrane's Canal and the Sea.

The *Cooum* may be considered an extensive tank. A quantity of filth has accumulated from the constant flow of sewage into it, from Vepery, Egmore, Chintadrapett and part of Triplicane, so that the bed of the river is raised considerably above its natural level. For the last three miles of its length it has no fall at all. For nine months of the year it has no outlet to the sea. To attempt to convert it into a sewer, is simply to make it a cess-pool.

The *Adyar* has also no outlet to the sea except for a short time during the north-east monsoon. It is even less adapted for a drainage outfall than the Cooum.

Cochrane's Canal has had its bed raised by accumulation of solid matter, there being no current. At present it is the cess-pool for the western portion of Black Town.

The *Sea Coast* of Madras extends about 9 miles. The slope is very gradual; at 3½ miles the depth is about 63 feet. The difference between high and low tide is about 3 feet. There are two principal currents, most likely caused by the wind, flowing, in opposite directions, parallel to the coast.

A very complete meteorological chart accompanies this section of the report.

The second chapter is devoted to a consideration of the present condition of the town of Madras. It is shown that the density of the population is about 2½ times that of London, where the average number of persons to a house is 5. In Madras the houses are 32,610, population 427,771, average

w... is to be rendered unfit for u...
... ... arred, for the wells are ...
and in consequence have been abandone...
facts, which have been brought to ...
borings I have made in all parts of the ...
Government. I bring them thus prom...
order to show the necessity for a system ...
and sewers, which, while it relieves the dv...
will, at the same time, preserve the wat...
contamination.† "

Captain Tulloch goes on to show t...
belief, there are, as a rule, no cess-p...
solid filth is removed by scavengers ...
Municipal establishment. But liqu...
into the street drains, which are oper...

" * Every well in the town should be clos...
foul water never ceases to give off poisonous g...
the longer it is kept."

" † In some places I met with pure liquid ...
about this, for the smell was so overpowering ...
in the matter. As a general rule, a well dug ...
produce good water—provided that it is suffici...
ings. By good water I mean water not impre...
situated, as Madras is, on the sea-coast, and ...
be impossible, unless a very great number of b...
the water would or would not be slightly b...
occurs, the sand is uncoloured, sharp and sv...
which sewage has percolated through the up...
coloured dark with organic matter, and is mo...
smell. It is remarkable that some wells dug ...
populated neighbourhoods produced good wa...
explain this peculiarity. The chief supply...

and, like the sewers, built of ordinary brick set in shell-lime mortar :—

"They are as porous as can be, and smell most offensively. Having no proper slope, they are daily choked up with filth, the removal of which is effected by manual labour only. It is for the cleansing of these drains, which are a receptacle for all the solid filth of the streets, that so large an establishment of scavengers is employed by the Municipal Department."

The present main sewers are described, and it is noticed that there are individual streets and extensive areas which have no outlet at all;—the sewage stands in open trenches round the dwellings, and stagnates from day to day, and from month to month.

We do not for a moment mean to intimate that Captain Tulloch is exposing a state of things, the existence of which was not previously known, but he has very properly introduced into his Report those details which have been ascertained upon his personal observation. The facts being as stated, who can wonder at miasmatic diseases being endemic in Madras, and at their, every now and then, breaking out under epidemic influence?

Captain Tulloch in his third chapter considers "Dry Conservancy." He first notices Dr. Hathaway's* system and next Dr. Thudichum's and the Rev. Mr. Moule's improvements—with which our readers are familiar. As regards the system of dry earth conservancy, Captain Tulloch says:—

"So far as the application of dry conservancy to latrines is concerned, I am entirely in accord with the advocates of this system—provided that the cost of it is not to be borne by the people, who could never, as will be shown presently, afford to pay for it. But some of these advocates, in the heat of the excitement caused by a new and very important discovery, will not look at the question except from one point of view. The consequence is, that the most absurd and extraordinary statements are made by them as to the efficacy of the new principles, and as to the wonderful application that may be made of them. 'The old system of drainage by sewers is obsolete—is a quarter of a century behind the age—is not worthy the science of the day. Dry conservancy absolutely revolutionizes the subject of drainage. We must begin *ab initio*—the great sanitary problem of the day has been solved. We are to have no more sewers and no more nuisances. The town is to be cleansed on new principles, and at little or no cost to the inhabitants.'"

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* The details of this system will be found *in extenso* at page 222 of vol. vi. of this Journal.

Captain Tulloch goes thoroughly into the subject, and he appears to have selected Mr. Cornish's pamphlet on "The Cleansing of Towns" as the chief document advocating the application of the dry-earth system to Indian towns in general and to Madras in particular; so that this chapter might have been headed "Refutation of the arguments contained in Mr. Cornish's pamphlet." Our author shows that there is a fallacy in the argument, that, "because dry conservancy is the best system for privies; therefore it is the best system for towns;" inasmuch as in privies excrementitious matters only are dealt with, and as regards towns, the same excrementitious matters form but an inappreciable amount of the filth to be removed.

"It is insisted that this system must *supersede* that of sewers. The advocates of the former keep urging that all the urine and fæces will be carried away and converted into manure, and, of course, nobody can deny the proposition which is perfectly patent. But it is also true that almost all the sewage will be left behind. In a word, though urine and fæces are undoubtedly the most offensive part of town sewage, yet in bulk they do not amount (as in the case of London for instance) to more than $\frac{1}{200}$th. of the whole. This is so easily proved, that it can escape the observation only of persons so wedded to a new theory, as to be unable to look adverse facts in the face, but it explains at the same time why those who have to remove the sewage in England do not consider the extravagant proposition to do away with sewers worth refuting."

If in Madras 5 gallons only of water are used per head of the population, the excrementitious matter (2¼ lbs.) will be less than one-twentieth of the actual sewage. But Mr. Fraser, C. E., proposes by his water-supply scheme, now in the course of execution, to supply 20 gallons per head per diem, so that the excrementitious matters will form but one-hundredth of the waste water. In Bombay the proportion of night-soil to liquid sewage is calculated at 1 to 775.

It is quite unnecessary to reproduce here the arguments used to show the necessity for the removal of waste water—to prove, in fact, that it is liquid sewage. The advocates of dry conservancy acknowledge that waste water is *only less offensive* than excrement; but we are not aware that they have ever proposed any mode of getting rid of it, though we cannot suppose that any sanitarian ever contemplated its being removed by such a system of open drains as now forms the grand nuisance of Madras. Captain Tulloch puts the

system of dry conservancy as a whole before Government. He says public privies of an improved design are to be erected in all parts of the town, and at such convenient distances apart as shall induce the inhabitants to use them, and he copies Mr. Cornish's plan of a suitable latrine. And here we must endeavour to epitomise our author.

The entire success of the scheme will depend upon a universal use being made of the latrines. If some use them and some do not, we shall have both the expense of the new system and the nuisance of the old. People can scarcely be compelled by law to use the latrines, for "every man's house is his castle."

The existing public latrines are made use of by women of the very lowest classes only, and merely under strict police supervision.

"Can it be expected that any respectable man will permit his wife or his daughters to leave the privacy of their house—to walk, say, 150 yards in dry and wet weather along a public street to a public place for *such a purpose*—to mix there with perfect strangers —and to perform such a duty in their very presence. Yet, if the women as well as the men did not use the privies, what measure of success would attend the introduction of dry conservancy."

* * * *

"Besides, how will it be possible to arrange for the wants of the sick, who will not be able to leave their dwellings, and who, at the rate of five sick in every hundred of population, will amount in number to 430,000 $\times$ 5 $\div$ 100 $=$ 21,500 souls—producing daily more than 21 tons of excrementitious matter."

Will Europeans and East Indians submit to the arrangement? are separate latrines to be provided for the different races ? If so the cost will be increased. In rainy weather, when urine and fæces are most offensive, will the people be induced to go to the latrines ? Will not the latrines themselves become mere cess-pits by neglect of the toties, unless efficient supervision is exercised over them ? Can natives be trusted for this purpose ? If Europeans are employed, again the expense will be increased.

One great advantage has been claimed for universal dry conservancy, viz., that it is much cheaper than the sewer system.

"This is certainly the most unfortunate mistake that has yet been made by the advocates of the new theory, and the one which will tend to damage it more than anything else. Dr. Cornish says :—

"'Before spending some half a million of money in a system sewers for Madras, it may be well perhaps for the rate-payers, w will ultimately have to defray the cost of the 'improvement,' to quire whether for an expenditure of one-twentieth part of the mon it may not be possible to make our chief city a model of cleanlin and its excreta so valuable, that the cost of collection should b mere trifle in the municipal expenditure.'

"It will thus be seen that 2½ lacs of rupees is the sum set down cleansing Madras thoroughly according to the new principles. has always been maintained by the Engineering profession, th whatever objections might be raised to the sewer system, it was *cheapest* means known of disposing of sewage. A sewer, once bu properly, will, with occasional trifling repairs, last for centuries. inconceivable quantity of water may be passed through it. It w work as well in the night as in the day. With fair play the sup vision required is most trifling. It is necessary, therefore, to asc tain if dry conservancy is cheaper."

How many latrines will be required? European Reg mental privies provide seats in the proportion of about per cent. of strength. But Captain Tulloch takes 6 seats f every hundred souls, equal to 25,800 seats for the inhabitan of Madras. Mr. Cornish's latrine contains 40 seats, and estimated to cost 2,384 Rupees. Total latrines requir 645. 100 existing latrines might be altered for 2,000 R each;—total cost:—

		Rs.		Rs.
100 present latrines	×	2,000	=	2,00,000
545 new latrines	×	2,384	=	12,99,280
			Rupees	14,99,280

645 new urinals, estimated by Captain Tulloch cost Rupees 400 each. 645 × 400 = Rupees 2,58,000.

645 sheds to keep dry earth in, again according Captain Tulloch, Rs. 500 each—645 × 500 = Rs. 3,22,5

Captain Tulloch next estimates the amount of ground be covered by these buildings. He is alone responsible the estimate, except as regards the latrines, and here he a to the area, a ten feet wide passage all round and a lavato His figures are:

	Square feet.
Latrines.	2,180,000
Urinals	322,500
Sheds.........	2,580,000
Total...5,082,500	= 2,117 grounds of la

Land in the heart of the town is expensive. On the outskirts of the town, the Collector's Department have valued some land required for the project at 400 and 350 Rupees per ground. However, Captain Tulloch takes the moderate price of Rupees 250 per ground, and the cost of that required for the above purposes will then be Rupees 5,29,250.

The Conservancy Establishment required is next noticed. Mr. Cornish says four toties to each latrine, and Captain Tulloch says suppose the four toties to look after both latrine and urinal, then 2,580 toties will be required; and two will be required at each shed to pound and store the clay, &c. 1,290 toties, total 3,870 souls. Suppose their pay only 3½ Rupees each per mensem, total monthly cost Rupees 13,545, and the annual cost Rupees 1,62,540. At 5 per cent. the above sum would represent a capital of Rupees 32,50,800.

The cost of removal of the manure is next considered. We have not space to reproduce the calculations, but it is shown that about 570 pairs of bullocks would be required daily, costing, at 12 Rupees per pair per month, an annual sum of Rupees 82,080, which capitalized at 5 per cent. would be Rupees 16,41,600!

" Without going further, I will sum up the total cost of universal dry conservancy for Madras as proposed to be carried out by Dr. Cornish.

	Rs.
Cost of Latrines....................	14,99,280
„ Urinals...........................	2,58,000
„ Sheds..............................	3,22,500
„ Land for above....................	5,29,250
„ Establishment.....................	32,50,800
„ Carting away manure..........	16,41,600
Total Rupees...	75,01,430

" I was as unprepared for this result, when I commenced the calculations, as, no doubt, Government will be to have it placed before them. Indeed, like many people, I supposed at first that there might be some grounds for Dr. Cornish's statement that Madras could be made 'a model of cleanliness' for 2½ lacs of rupees.* Yet no charge has been made for the carts which should be of a

* There is no limit to the requirements of dry conservancy. Every increase in the population will require more latrines, more urinals, more sheds, more clay and a larger establishment. If the population increases at the rate of 1½ per cent. there will be yearly 430,000 x 1½ ÷ 100 = 6,450 more people to be provided for and they will require 10 latrines, 10 urinals, 10 sheds and 40 scavengers. In the course of a few years the cost would be something frightful."

peculiar construction to prevent the escape of poisonous gases, and which will cost a great deal of money—no charge for lighting the buildings during the night which is proposed by Dr. Cornish himself—nor for the 25,800 earthenware pans required in the seats—nor for the iron receptacles for the urine and fæces—nor for the removal of the running stream of water proposed for use after defecation—no charge for the clay [in a foot note Capt. Tulloch says this charge would represent a capital of nearly 31 lacs]—no charge for supervision over the army of sweepers (3,870 in number)—and no charge for repairs of any kind whatsoever, which will be heavy for works of this nature,—and yet the cost has reached the enormous capital of 75 lacs of Rupees. It may be urged that the clay will be brought and the manure carried away for nothing. Let me even grant the extravagant proposition, that there are men in Madras willing to risk a capital of 16½ lacs of Rupees on the mere chance of being able to sell manure. The balance will then be 75 — 16½=58½ lacs of Rupees, and for this sum what is to be got—the removal of one-twentieth or of one-hundredth of the sewage, according as 5 or 20 gallons of water are used per head of the population. The rate-payers of Madras who will ultimately have to defray the cost of *this* 'improvement' would indeed do well to enquire whether Madras can be made a 'model' of cleanliness for 2½ lacs of Rupees; and if not, whether it would be worth while to secure the 'improvement' for three quarters of a million sterling, in order that they might have all the sewage left behind."

Captain Tulloch next quotes from the "Report on the Dry-earth System of Conservancy" by the late Madras Sanitary Commissioners—to the effect that in hospitals the cost of the system for Europeans is about 8 annas, and for Natives about 3 annas and 3 pies, per head per mensem; whilst in Barracks, Jails, &c., the cost may be taken at about 4 annas per head per mensem. And applying these data to Madras the monthly cost will be Rupees 1,07,500, and the annual cost Rupees 12,90,000, which capitalized at 5 per cent. will represent 258 lacs of Rupees or upwards of 2½ millions sterling—approaching the cost of the stupendous Drainage Works of London. And in this estimate the cost of the latrines and of the land has been entirely omitted!

"It will now be seen why, in a previous part of this report, I said that I was entirely in accord with the advocates of the system of dry conservancy—provided that the cost of it was not to be borne by the people.

* * *

"It is really time to look facts in the face. The state of Madras is quite disgusting. Some thing must be done to remedy it sooner or later. Dr. Cornish says—'adopt dry conservancy, and Madras

will become a model of cleanliness for 2½ lacs of Rupees.' The Sanitary Commissioners, on the other hand, report officially to Government that dry conservancy will cost 4 Annas per man per month, which, as I have shown, represents a capital of 258 lacs of Rupees, and is more than 100 times the amount of Dr. Cornish's estimate. What is the use of urging that the manure produced on the new principles will fetch money, or that the cost of collecting it will be, as declared by Dr. Cornish, 'a mere trifle in the municipal expenditure'? Can any people be found in Madras willing to buy manure of the value of 2½ millions sterling? Because, until they come forward, some one must pay for the experiment, and it is utterly impossible that the inhabitants can afford to do so.

"When the advocates of dry conservancy themselves show that the cost of removing the excrementitious matters only will amount yearly to more than four times the whole Municipal income, it is really necessary to enquire whether there is not some other mode of cleansing Madras, and whether drainage by sewers is not, after all, both the cheapest and the most effectual means of doing it."

Want of space compels us to leave Captain Tulloch here for the present. In our next we hope to complete our notice of his Report by epitomizing his answers to Objections to Sewers, and the Description of his Project.

But we cannot close this paper without observing that Mr. Cornish has not been quite fairly dealt with in the Report. We know Captain Tulloch too well to suppose for a moment that he would wilfully misrepresent any man; in fact, we are quite sure that he would rather err in the other direction, and that a conviction of misrepresentation would be a matter of deep regret to him.

Captain Tulloch's first error as regards Mr. Cornish is in assuming that the latter gentleman in any part of his pamphlet states that the cost of dry conservancy is the one-twentieth part of half a million of money. Mr. Cornish's pamphlet is suggestive only, and all that he says is that it will be well for the rate-payers to enquire whether, &c. &c.

This is very far from making any such statement as is attributed to him: Captain Tulloch has here made the enquiry, and although Mr. Cornish may not perhaps quite accept his figures, we make no doubt he will own that the result of the enquiry shows that his question cannot be answered in the affirmative.

Secondly, Mr. Cornish insists upon the utilization of the excreta as manure, and that from the expense of the dry earth system must be deducted the value of the manure which

he thinks will "*by and by* find a ready sale" at a price sufficient "to nearly pay the whole cost of the Conservancy Establishment." Nowhere does Mr. Cornish put this matter otherwise than as a contingency, he says distinctly that it is only "when the people shall have once learnt its value" that it will sell. So that we do not think it quite fair for Captain Tulloch to follow up a quotation from Mr. Cornish with the question "Can any people be found in Madras willing to buy manure of the value of 2½ millions of money?"

Thirdly, Mr. Cornish nowhere even suggests that the same number of urinals as latrines, would be required, nor do we suppose that he contemplated a shed for storing earth of the same size as his latrine. He might therefore fairly object to Captain Tulloch's including his own estimate of the cost of these buildings as correct items in the cost of dry conservancy.

As we before said we feel positive that Captain Tulloch had no intention of acting unfairly by Mr. Cornish, and of course it is possible that he may not take the same view of the matter as we do.

One more point we must notice. The Sanitary Commissioner has, of course inadvertently, led Capt. Tulloch into a calculation upon what we think erroneous data. In his Report on dry-earth conservancy (which it should be remembered has reference only to such Public Institutions as Barracks and Regimental Lines, Hospitals, Jails, &c.,) he says "the cost in Barracks, Jails, &c., when men using the latrines are in health would be about one-half of the above [*i. e.* for each European 8 Annas, and for each Native 3 Annas and 3 Pies per mensem]; say about 4 Annas per month per man, supposing the cost to be calculated on Dr. Blacklock's data." We suppose this should read "4 Annas per month for each European and 1 Anna and 8 Pies for each Native." Then Captain Tulloch might have said that considering the proportion of Natives to Europeans in Madras this sum may be taken as 2 Annas per head per mensem, and his total would then have been 129 instead of 258 lacs.

However we think Captain Tulloch has triumphantly shown the enormous cost of the dry-earth conservancy, and that even when it has duly done its legitimate work there remains a very large quantity of liquid sewage either to be carried away by sewers or to be allowed to stagnate and pollute the air and ultimately to sink into the earth. In our next number we shall have something to say on the latter subject.

PART III.

MEDICAL MISCELLANY.

No. 9.—*Primary and Secondary Amputation, for dry Gangrene of the leg, the Sequela of Fever; with Remarks.* By JOHN SHORTT, M.D., F.L.S., M.R.C.P.L., General Superintendent of Vaccination, Madras.

CHOKALINGUM, aged 18; caste, Malabar; trade, servant.

11th February 1861, admitted. The patient was brought to the Civil Dispensary at 10 A.M. in a dooly, from the village of Cheyoor, a distance of thirty miles from Chingleput, with gangrene of the right leg, extending up to within three inches of the knee joint; the lower half of the limb is perfectly black, the foot dry and hard, there is a well established line of demarcation separating the dead from the living tissues, and the tibia and fibular are denuded and bare to the extent of an inch, at which part they present a dirty white color. The joint is flexed on the thigh, and about the upper part of the knee slight redness and vesication are present.

The patient is a youth and rather emaciated in his appearance; pulse 84; skin cool; tongue foul; bowels regular.

The following history has been gleaned from the patient himself. About two months ago he was seized with fever, which increased in severity until the tenth day, when the leg and foot became œdematous; the fever now subsided, whilst the swelling increased apace and soon embraced the entire circumference of the leg, and encroached upwards, and after a while terminated in suppuration, which result, however, did not occur in the foot, when the swelling subsided. The discharge was scanty, purulent and offensive. In a short time, the patient observed that the toes of the right foot began to assume a blue color, and become painful to the touch, feeling cold and emphysematous; the colour gradually increased and extended over the entire foot and leg, eventually growing black. As the mortification extended up the leg, the foot became dry and hard, and about a fortnight prior to admission, the separation between the living and dead tissues took place, with profuse ichorous discharge from

the lower part which was extremely offensive. Had been taking native medicines without relief.

Ordered Ext. Opii. gr. i. at bed time with Chloride of Lime wash to the leg.

12*th.*—At 9 A. M. the patient was brought under the influence of chloroform, and the leg amputated at the knee joint. He stood the operation well though there was some loss of blood; small quantities of Port-wine and water were given him. The flap was brought together by silver wire suture, adhesive straps and bandage.

To have cold water applied. Diet,—Conjee and Mutton broth.

Vesp.—No oozing from stump, patient is comfortable. Pulse 100, soft; skin hot; bowels opened once early this morning prior to operation.

℞. Tinct. Opii ♏ xv.
„ Hyoscyami ♏ xv.
Mist. Camphoræ ℥iss.
M. ft. Haust, to be taken at bed time.

13*th.*—Slept the greater part of the night, feels thirsty this morning, has some heat of skin, pulse excited.

℞. Potass. Nitrat. gr. v.
Ant. Pot. Tart. gr. 1-16.
Aquæ ℥iss.
M. ft. Haust. To be taken three or four times a day.

14*th.*—States that he slept last night from a draught he took composed of

℞. Spts. Æther. Nitric. ʒss.
Tinct. Opii ♏ xx.
„ Hyoscyami ♏ xx.
Mist. Camphoræ ℥iss.
M. ft. Haust, at bed time.

Heat of skin continues. Pulse excited. The bandages looked soiled with blood, probably the result of the cold water application.

Cont. Nitre Mixture.

Vesp.—Has a good deal of heat of skin; bowels have not been moved since the 12th.

℞. Hydrarg. Chloridi gr. iii.
Pulv. Antim. Co. gr. iii.
M. ft. Pulv. at bed time.

15th.—The bandages being much soiled were replaced this morning. The stump looked well, some purulent discharge present. States that he slept part of the night and is feeling better.

To take port wine ℥iss, Quinæ gr. i at midday and to have immediately Ol. Ricini ℥ss, to be repeated if necessary in the course of three hours, and should heat of skin return to have ℥i. of compound saline mixture every two hours during the day.

Vesp.—Bowels opened once scantily from the castor oil, has a good deal of fever about him now.

16th.—Did not sleep during the night, is inclined to wander. Bowels have not been moved, has a wild look, and answers questions slowly. Pulse; 100, small; skin dry, tongue loaded and foul.

℞. Haust. Purgans. ℥iv.
To be given in two doses.

To have also a turpentine enema now. Head to be shaved and a small blister applied to the nape of the neck. Should his bowels be freely opened, to take the following in the course of the afternoon.

℞ Hydrarg. Chloridi gr. ii.
Pulv. Antim. Co. gr. ii.
Quinæ Disulph. gr. i.

M. ft. pil. To be taken with mucilage acacia every 3rd hour.

16th.—Has strong fever and is delirious; bowels opened.

Continue Pil.

To have ℥i. of port wine every hour.

17th.—Was slightly delirious during the night, appears more composed now—pulse full and hard, skin cool, bowels confined. To have a turpentine enema at 12 noon, and to take one ounce of arrack with an equal quantity of mutton broth every 2nd hour.

Vesp.—Continues delirious, the mutton broth makes him sick.

Continue.

18th.—7 A. M. Delirium continued through the night, is at present more collected; pulse 88, soft; skin cool; bowels open.

To have Quinæ gr. v. with ℥i. of port wine thrice to-day.

Omit Pills.

Vesp.—5 P. M. Continues collected; skin cool.

Continue.

19*th.*—7 A. M. Better, slept pretty well during the night. Stump is sloughy and the bone protrudes a little. It was dressed with warm resin ointment and lint.

Continue Quinine and wine.

20*th.*—7 A. M. Complains of nausea; stump continues in a sloughing state. Is more collected and expression of face clearer; bowels open.

To have an effervescing draught with 20 drops of Tinct. Hyoscyami now. Continue wine and quinine with warm dressings.

21*st.*—Countenance more cheerful, skin cool, pulse soft; was rather restless during the night; bowels open.

Omit medicine.

To take ℞. Quinæ Disulph. gr. iii., Arrack ℥ii,
M. ft. Haust. ter in die.

To have milk and plantains for which he asks.

22*nd.*—7 A. M. Better, the stump has sloughed a good deal, but the slough has not separated—no line of demarcation has yet taken place; a large bed sore has formed over the sacrum.

Continue medicine.

Vesp.—5 P. M. ℞ Tinct. Opii. ♏. xv.
„ Hyoscyami ♏. xv.
Mist. Camphor. ℥i.
M. ft. Haust, at bed time.

23*rd.*—Slept well the whole night, stump still looking sloughy. Cont. Quinine and Arrack with warm dressings to the stump.

Rept. Haust anodyne at bed time, to have Conjee or Broth (mutton.)

24*th.*—7. A. M. Slept well, appetite improving, sloughs coming away at the edges of the stump.

Omit Quinine.

To have arrack ℥ii with an equal quantity of Chiretta thrice daily.

Rept. Haust Anodyne.

25*th.*—Better, slept well, countenance cheerful and ex-

pressive of relief. The extent of slough can be obscurely defined. Bowels moved once during the night. The arrack intoxicates the patient.

To take ℥i instead of ℥ii of Arrack.

Decoct. Cinch. ℥ii. in a draught thrice daily in lieu of the chiretta. Cont. Haust Anodyne.

26th.—7. A. M. Is going on comfortably, the sloughs are loosening and the line of demarcation becoming more evident. Slept well, appetite improving, bowels open.

Continue medicine.

Has had nitric acid lotion with lint applied to the part and the stump wrapped with plantain leaves and bandaged.

27th.—7 A. M. A good deal of the slough from stump has come away, and the line of demarcation is now fully established; about three inches of the lower end of the femur protrude. The nitric acid lotion causes great pain. The bed sore is also cleaning, the left foot is swollen; the patient appears more cheerful and finds his appetite begin to return; did not sleep well during the night, bowels confined.

Continue medicine.

The nitric acid lotion to be weakened (ʒii to Oi) and to have ʒi. of Tinct. Opii in it. The anodyne draught to be increased in strength ♏. xx.

28th.—Sloughs from stump clearing away; bowels open.

Continue Medicine. Dry lint dressing.

1st March.—Did not sleep well from pain it would appear of the stump which is clearing, and so is also the bed sore; appetite increasing; bowels open.

℞. Arrack ℥i.
Ferri Sulph. gr. i.
Tinct. Cinch. ʒi.
„ Opii ♏. x.
Decoct. Cinch. ℥ii.
M. ft. Haust thrice daily.

To have a grain of solid opium at night instead of the draught and the following lotion with lint dressings.

℞. Acid. Nitric. Dil. ʒi.
Tinct. Opii ʒi.
Aquæ ℥i.
Ft. lotio.

2nd.—Stump cleaning and is otherwise improving.

Continue.

4th.—Improving slowly, stump cleaning, bowels regula

Cont. medicine. Warm turpentine dressing.

5th.—Better; stump clean and healthy, bed sore cleanin The patient was yesterday laid on his left side, and to-da turned over on his abdomen in consequence of a second so on the left hip. The skin about the sides and nates wa washed with arrack, and the head, neck and arms smeare with ol. olivæ.

Continue medicine.

To have a measure of Portwine every morning.

7th.—Continues to mend slowly.

Continue medicine.

9th.—Improves slowly, bedsores are clearing.

Continue medicine.

The Ferri Sulphas to be increased to gr. ii. with the ad dition of a grain of quinine to each draught.

11th.—Continues to improve slowly, bowels regular.

Continue.

13th.—The patient was this morning brought under th influence of chloroform and the stump amputated to th extent of four inches; the flaps were brought together b silver wire sutures, adhesive straps and bandage. Conside ing the patient's weak state, he stood the operation well, l lost a little blood from the great oozing subsequently fro the stump, five small arteries requiring to be tied.

Continue medicine.

℞. Tinct. Opii ʒss.
Spts. Æther. Nit. ʒi.
Mist. Camph. ℥i.
Ft. Haust, at bed time.

14th.—Better. Continue medicine and dressing.

15th.—Idem.

18th.—The stump as well as the bed sores are well.

Continue medicine.

21st.—The patient is progressing favorably but slowl bowels open. Omit medicine.

℞. Tinct. Cantharidis. ♏ vi.
Infus. Quassiæ. ℥ii.
Tinct. Hyoscyami ♏ vi.
Ft. Haust, thrice daily.

℞. Ext. Cannabis gr. i.
Quinæ Disulph. gr. ii.
Ft. Pil at bed time.

Omit Portwine. To have a measure of arrack daily.

1st April.—Continues to progress favorably, the sores are healing slowly. Since 21st of March he has been taking the following :

℞. Tinct. Cantharidis ♏ vi.
„ Hyoscyami ♏ vi.
Infus. Quassiæ ℥ii.
Ft. Haust, thrice daily.

℞. Ext. Cannabis gr. i.
Quinæ Disulph. gr. ii.
Ft. Pil at bed time.

Omit all other medicines : continue Portwine and arrack.

15*th.*—Improves slowly.

Continue. Omit Portwine.

20*th.*—Continues to mend slowly; sores healing.

Omit mist. cantharidis. To have in lieu Fish Oil ʒii. to be gradually increased to half an ounce.

Omit Ext. Cannabis and simple dressing.

4*th. May.*—The bed sores have nearly healed. Since the last few days the stump has quite healed, but two sinuses have opened out which discharge purulent matter. The patient is weak and greatly emaciated. Appetite and sleep good ; bowels regular. Now takes ʒiii. of fish oil ; to be increased to ℥ss. and to have a grain of opium at nights. Simple dressing.

4*th. June.*—Continues to mend slowly : omit medicine.

12*th. July.*—Well, discharged.

REMARKS.—This case is of considerable interest, from the fact that mortification is not a usual termination of fever, but at the same time, it should be borne in mind, that fever is a blood disease and is known to produce deleterious effects on that fluid, impoverishing and vitiating its quality, as well as retarding its force, and by causing venous stagnation in the

extremities, it might account for the mortification that took place in this case, resulting in destruction of the limb. I was anxious to save as much of the limb as possible and, notwithstanding some trifling unfavorable symptoms then present, I amputated the leg at the knee joint, under the impression that as the line of demarcation was fully established, and the separation of the living from the dead tissue had taken place at the upper third of the leg, there was no fear, but unfortunately the fever returned with as much, if not greater, force than the first attack, and mortification of the stump ensued. From this secondary fever and mortification, the patient was so reduced in flesh and strength that I was long apprehensive of his fate. His skin became so irritable, that every prominent point subjected to pressure ulcerated and formed large bed sores, such as the sacrum, brim of the ilium and trochanters. The sore on the sacrum particularly was from 3 to 4 inches in diameter. After various expedients, I was enabled to extemporize a very serviceable though rude water-bed with a couple of puckally bags, and on this the patient was laid, even here it was the object to relieve the ulcerated parts of pressure; the patient before this had to be turned on his face and kept so for days together. The debility caused by the fever, the irritation from the bed sores, loss of blood from secondary amputation, &c., all tended to reduce the patient to so low an ebb that for days I despaired of his recovery; but, notwithstanding such formidable and untoward symptoms, with care and unremitting attention and the judicious administration of nutrients, tonics and stimulants, I had the happy satisfaction of seeing my patient make a good recovery eventually. Nothing perhaps is more trying, and calls for greater vigilance on the part of the Surgeon than the want of suitable appliances, and the personal attention to minutiæ so essential to ensure success in such cases. The limb was carefully examined, but nothing abnormal could be detected, the tissues of the foot and lower third of the leg were dry and hard, resembling in this respect those of a mummy.

No. 10.—*A Case of Poisoning by Belladonna, treated exclusively by the administration of Opium.* By Surgeon Major J. L. Ranking, Acting Garrison Surgeon, Trichinopoly.

On the 6th October 1866, I was summoned in haste to a lady said to be in "high fever and delirious."

I found the patient in a state of delirium of a busy pleasurable character—much resembling the delirium of 'Delirium Tremens'—with a turgid flushed countenance, a tumid upper lip, a hot skin, and a rapid bounding pulse.

The pupils were widely dilated, the eye brilliant and defiant in its expression. There were evident phantasm and mental illusions. She could not be made to reply to questions, was incoherent, but conscious. There was incessant motion of the hands and attempts to seize some 'air drawn' objects.

I was informed that she had taken an overdose of Belladonna in the form of two pills by the mouth; and an injection of the dried leaves. The amount used in either case was not known. The lady had a knowledge of drugs and was, it appears, in the habit of taking Belladonna to relieve pain in the abdomen described to be like colic, but occurring at the menstrual periods, and therefore, doubtless, 'uterine colic' as it is sometimes termed. It was subsequently ascertained that the poisoning had not occurred in the way, at this time, communicated to me.

I determined at once to give undivided trial to the antidotal treatment by opium; and as "Sydenham's Laudanum" was in the house, 40 ♏ were administered with some difficulty—the difficulty being partly owing to the patient's opposition, partly to spasmodic closure of the jaws, and partly to some impairment of the powers of deglutition, for the voice was husky, and there was evident dryness of the fauces. After administration of the vinum opii, as the patient made constant attempts to get out of bed to busy herself about her usual occupations,—she was evidently in imagination instructing a class in needlework,—I directed her attendants to let her move about the room. The first dose of Laudanum (Sydenham's) was given at about 9-30 P.M. At 10-30 a second dose of 20 ♏ was given, and as the patient

had now taken to her bed again, I directed a 3rd dose to be given at 11-30 and left; desiring that I might be called again at mid-night. I was not summoned, and visiting my patient in the morning found her in her right mind, and without the faintest recollection of what had passed, or any knowledge of my having been with her during the night.

She felt somewhat confused in mind and complained of dryness of the mouth and constriction of the fauces. The pupils were still largely dilated, the turgidity of the countenance and the humidity of the upper lip had passed off, and the facial expression was natural.

Her friends informed me that after taking the 3rd dose of the Laudanum at 11-30 she became so much more tranquil, that they did not think it necessary to disturb me. That the mental illusions slowly passed away, and that about 3 A. M. she fell asleep.

I now ascertained the precise circumstances under which the poisoning had occurred.

She suffered on the morning of the 6th from "pain in the bowels," and made two decoctions, one of Marsh Mallow, and the other of Belladonna leaves, fresh from France, the latter being intended as an injection.

She drank by mistake (as it is supposed) the latter for the former, taking "about a breakfast cup full" at about 5 o'clock in the afternoon or 4 hours before I was sent for, the decoction was made of ℥ii. of the dried leaves to a pint of water.

The symptoms of poisoning were well marked, and the antagonistic or antidotal effects of the opium were manifest. At any rate, no other remedial agency of any kind was employed.

I did for a moment contemplate administering an emetic of sulphate of zinc, which was in the house, but as I considered myself justified in giving the antidotal powers of opium a fair trial, I determined not to adopt any subsidiary measures which might obscure or overlie the influence of the remedy.

It may of course be said that the patient might have recovered without the opium—possibly so; but not I opine so speedily and completely. At any rate, the case is of interest, and serves to illustrate the mutual antagonism of Belladonna and Opium in the animal economy.

No. 11—*Cases of Rupture of the Spleen.* By A. PORTER, Esq., M.D., Zillah Surgeon, Akola.

CASE 1.—On the morning of the 3rd of August 1866, Lutchmun, the deceased, was drinking with some companions at a 'Kullah' shop, when a dispute arose:—blows were presently interchanged, and his opponent, Humut Khan, struck deceased over the splenic region with a bamboo, when he fell down and almost immediately expired.

The chief constable who saw the corpse shortly afterwards, testified to marks of blows being visible on different parts of the body, but more especially in the left loin.

The body was not brought for examination till the morning of the 6th August. It was then in an advanced stage of decomposition. No external wound or bruise was visible. The contents of the skull were not examined. The organs of the chest appeared healthy. On opening the abdomen, a large quantity of sepia-like fluid—changed blood—was found in the pelvis and about the spleen; of the latter nothing remained except the capsule which, from its size, gave evidence of the spleen having been considerably enlarged when the accident occurred, the rupture extended for some inches along the external surface near its anterior border; the other organs of the abdomen appeared healthy.

CASE 2.—This is the case of a young man, by name Sewram Wd Raghojee, who, while working in the field, suffered compound fracture of the ring finger of the left hand, either by accident or, as was suspected, in a quarrel with his father. It was said to have been caused by the father striking at a bullock with an iron scraper, and hitting his son's finger instead; no other hurt is said to have been received. This occurred on the 3rd of August, and Sewram remained at home applying remedies till the 6th, when he became very ill, and complained of pain in the neck; he continued getting worse till the evening of the 8th, when he died. No more definite account of the symptoms could be elicited, but the cause of death was probably Tetanus.

I examined the body on the morning of the 9th of August. Except the compound fracture of the left ring finger, there was no other mark of violence on the body. On opening the skull the pia mater was found congested, the brain substance was hard and presented red spots on section, the ventricles

contained a little bloody serum. The lungs were healthy. The right side of the heart was gorged with blood, as were also the veins of the neck; there was about an ounce of serum tinged with blood in the pericardium. On opening the abdomen a quantity of dark red blood was found in the pelvis and behind the spleen; the spleen was slightly enlarged, congested, and much softened behind, where there was a rupture near the hilus of about half an inch in length. The other organs appeared healthy, except the kidneys, which were congested.

The rupture of the spleen in the latter case might be accounted for by supposing that the spleen, having been already softened by inflammation (arising perhaps from a blow received at the time of the other accident) had been ruptured by pressure from a tetanic spasm of the diaphragm and abdominal muscles. Among other things the freshness of the body as well as the appearance of the blood effused (which was more or less separated into clot and serum) precludes the idea of the softening being post mortem, and of the rupture being caused by rough handling after death.

No. 12.—Paralysis; Exophthalmos, Amaurosis; Epileptic attacks; Death. Large Scrofulous tumour of the brain. By Asst. Surgeon W. N. CHIPPERFIELD, Acting Physician, General Hospital, Madras.

Case reported by Student Daniel Thomas Baker.

JUGGIAH, a Hindoo, aged 27 years, a Private in the 23rd Regt. C. L. I.

2nd February 1866.—Admitted into the General Hospital, by transfer from the Eye Infirmary, with the following statement of his case.

"*Detached Retina. Cerebro-spinal Amaurosis.*

"*24th June* 1865.—*Ophthalmoscopic Examination. Left Eye:*—optic disc seen very indistinctly, outline cannot be readily made out; position indicated by large vessels; surface of the disc obscured by a whitish deposit; the disc cupped and anæmic, retina opaque, the vessels small and traced with difficulty. Retina close to the optic disc raised in

folds from sub-retinal effusion. *Right Eye* :—Same pathological condition as in the left eye. Retina of both eyes totally insensible to light.

"The disease is one of detached retina combined with cerebro-spinal amaurosis. As this patient is suffering from cerebro-spinal paralysis, I recommend his being transferred to the General Hospital, pending the final disposal of his case.

"Unfit for any further service.

"(Signed) G. SMITH, M.D.,
"*Superintendent Eye Infirmary.*"

This patient presents the characteristic attitude of an amaurotic person. The globes of the eyes are extremely prominent, the eyes fixed, the axes parallel and directed straight-forwards; pupils widely dilated. He is in a condition of imperfect general paralysis, but is able to walk with the aid of a guiding hand. Sensation is not impaired, at least no evidence of anæsthesia can be obtained. He has a great tendency to sleep, and is with difficulty aroused. Holds no converse with any one in the ward, but when thoroughly aroused answers questions slowly and deliberately; sometimes he gives a curt reply and immediately falls asleep again. The excretory functions are duly performed, and he intimates to his attendant when he requires aid to go to the latrine. Pulse full, soft; Tongue clean. This man is said to have been in the habit of consuming large quantities of opium for several years.

Full diet. To be carefully watched.

17*th February.*—No change. Eats his food with avidity sitting upon his cot and feeding himself.

4*th March.*—Has continued much the same, until last night, when he passed his urine involuntarily, and to-day he is passing both urine and fæces without his knowledge. Cannot feed himself now, has lost guiding power over his hands.

To have a blister applied from nape of neck to lower part of dorsal region of spine.

14*th.*—Blister healed: in much the same state.

℞. Syrup Ferri Iodidi ♏ xxv. thrice daily.

16*th.*—Is a little improved; no longer passes his stools involuntarily, though the urine is frequently so passed. But

the general paralysis is rather more marked. Is a little inclined to talk. Has taken a fancy for sitting out in the verandah, and the breeze has induced a slight conjunctivitis.

Continue Syrup.

℞. Aluminis Sulph. gr. iv.
Vini Opii ♏ xx.
Aquæ Font. ℥ ii.
M. ft. Lotio, for the eyes.

To have the Electro-Magnetic machine applied every day.

20th.—Conjunctivitis well. Somewhat improved in general health. The muscles are thrown into action on the application of the Battery.

Continue Treatment.

1st April.—Improving; the muscles have regained a great deal of their former energy. Is more cheerful; sits up and feeds himself, and converses with his attendant.

Continue.

20th.—Is rapidly gaining flesh and strength. Has lost much of the torpidity and stupidity which is so characteristic of cerebral disease; and is tolerably active and sensible. Would require no assistance at all, were his retinæ sensible to light. Pulse full, strong, regular. Skin normal. Bowels regular. Appetite good.

Continue.

2nd May.—Fell down in an epileptic fit yesterday when walking across the ward. Has now recovered from the somnolent effects of the fit. Is apparently enjoying his breakfast.

Continue.

20th May.—Not quite so well. Has a great tendency to sleep, and is getting morose and sullen again. General health appears good.

Continue.

1st June.—Fast falling into his old state of torpor and somnolency. Is getting quite indifferent to things about him. Sleeps nearly the whole day and night, but is easily roused. When asked a question hesitates a little before he replies, and sometimes his answers are very curt. Excretory functions natural. Appetite remains good.

10th.—No change for the better. Memory fast failing him,

and no doubt the brain lesion is rapidly advancing. Paralysis marked, but no anasthesia. Is not easily aroused. Answers questions rationally but hesitatingly.

Blister to nape of neck.

Omit Syrup.

11th.—Blister has not aroused him, is evidently rapidly becoming worse. Cannot feed himself, but takes his food well. Pulse full, very soft. Stools and urine passed unconsciously.

20th.—Is fast falling into a state of coma. Had another epileptic fit last night. Is with the greatest difficulty roused; does not speak. Some difficulty of swallowing.

To be well supported with fluid food.

1st July.—Getting worse day by day. Cannot swallow. To be supported by enemata of beef tea with a little wine.

10th.—Is now in a state of perfect coma.

20th.—Has lingered on until this morning at 5 A.M. when he expired.

Necropsy.—Six hours after death.

Body.—Well nourished. Eyes very prominent and not covered by the lids. Bridge of nose somewhat sunken.

Head.—On removing the calvaria, the dura mater covering the anterior lobes of the brain was found very dark and opaque. At the inferior part of the anterior lobes there was such firm adhesion of the membranes to the brain substance that the former could not be separated without the latter tearing. On endeavouring to remove the brain its anterior lobe was found firmly adherent to the base, and by a little traction it was separated, and there was found at the line of separation an irregular ragged surface, the margins of which were composed of dense, hard, yellow tissue. Upon examining the anterior fossa, a large mass of similar tissue was found occupying the centre of its site. This proved to be a scrofulous tumour, as large as a medium sized lime. When it was removed a remarkable condition of the fossa was found. The outer two-thirds of each orbitar plate of the frontal bone were in their normal position, but the inner thirds, with the crista galli process and cribriform plate of the ethmoid, had disappeared, and by the absorption of these and the greater part of the central mass of the ethmoid a deep sulcus had been formed, the lateral

boundaries of which were
and the floor was a thin lan
the level of the floor of the
ed by the body and olivar
was on a plane more than
cavity.

The thinned dura mate
The walls were so thin tha
any pressure being applied
them. The nasal fossa we
sist of the inferior meatuse

Upon examining the u
of the olfactory bulbs coul
rated part of the tumour.
nerves was embedded in th
selves and the optic tract
natural size. With the exce
contact with the tumour, th
The cerebellum was healt
appeared shrunken, and i
pale.

An examination of the
what firm external walls
portions were softened, th
ent. Under the microsco
spaces could be seen in the
nothing but a multitude o
nucleated corpuscles, cont
little masses of molecular
here and there a glomerulu

Urgent public business
making any minute exan
nerve substance, and this,
Medical College was closed
of this unique pathological

* (The condition of the sense of

No. 13.—*Madras Mortuary Report for the Third Quarter of* 1866. By W. Arnold Smith, M. D., Officiating Secretary, Sanitary Commission.

The third quarter is, as a general rule, the most disagreeable as well as the most unhealthy season of the year in Madras, a reputation which has been fully upheld during the period under review, by the very large increase in the mortality which has taken place.

The number of deaths registered from all causes has amounted to 4168, being an increase on the mean of the corresponding quarters of 10 previous years of 1266.

1861	4291
1862	3553
1863	2497
1864	2450
1865	3226
Mean	3203

The average number of deaths during the third quarter of 5 previous years, as shown in the margin, is 3203; there has therefore been an increase during the past quarter of nearly a thousand deaths, or to be accurate, 964.

Contrasted with the first and second quarters of the current year, there has been an increase on the former period of 1208 deaths, and on the latter 1242.

There has been a larger mortality amongst the European and East Indian communities than usual; 80 deaths have occurred amongst the former, and 153 amongst the latter, being an increase of 47 and 99 deaths respectively on the 5 year average.

Nearly half the deaths (33) amongst the Europeans are children of the military and civil residents. Of the remaining deaths amongst the adult population, 21 are civilians, 17 military, and 9 seamen.

Of the deaths amongst the East Indians, more than half (77) are those of young children.

Taking the population at 4,50,000, as has been done in previous reports, the death-rate per annum during the past quarter is 36 per mille.

The increased mortality noted above has been almost entirely due to miasmatic diseases. During the third quarter of 5 previous years, the average mortality from this order of diseases has been 1733, and that of deaths from other causes 1469. During the past quarter, however, there have

been 2667 deaths from mi
from other causes. The ac
therefore 933 from miasma
causes.

This increase in the mias
due to the great prevalence
town during the quarter, th
deaths from all the other di

FEVERS.—On examining
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shows

1861	544
1862	625
1863	521
1864	498
1865	579
Mean	553

the wave line of deaths fro
average during the first tw
maximum during the week
in that ending August 3r
deaths respectively were re

DIARRHŒA.—The deaths
94 les
whole
deaths
mean.
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their n

1861	309
1862	290
1863	201
1864	227
1865	305
Mean	266

of deaths occurred in the pr
ed amount to 20.

DYSENTERY.—The death
which
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Augus
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week,

1861	369
1862	338
1863	283
1864	257
1865	281
Mean	305

quarter, attaining a maximu

During the 5th week, or that ending August 3rd, the deaths fell to 5.

1861	162
1862	75
1863	16
1864	3
1865	14
Mean	54

SMALL POX.—The deaths from small pox do not show such a marked decrease on the average as has been noticed on previous occasions; but still the register shows a decrease of 25 deaths on the 5 year average, the mortality having been 29.

One of these deaths occurred in a European 19 years of age at the General Hospital.

There have been 24 deaths amongst the Hindoo and 4 amongst the Mahommedan population.

During the month of August, the wave line of deaths from this cause, runs almost parallel with that of the average. In the 7th week ending August 17th, 5 deaths are registered.

CHOLERA.—The deaths registered from cholera have numbered 1655, giving an increase of 1102 to the average mortality of the past 5 years.

1861	1568
1862	590
1863	15
1864	139
1865	455
Mean	553

The deaths from this cause, as compared with those registered during the first and second quarters of the current year, show an increase of 1386 and 1335 respectively.

During the whole of last quarter, cholera was never absent from Madras; but it was not till the 2nd week of that under review, that a marked increase took place at any one time in the mortality from this cause.

In the week ending the 13th July, the deaths suddenly rise from 40 to 157, and during the rest of the quarter never once fall below a hundred per week.

A glance at the diagram shows better than can be described the increment and decrement of the mortality during the past thirteen weeks.

Peddoo Naick's Pettah	244
Triplicane	117
Chintadrepettah	132
Pursewalkum	186
Washerman's Pettah	144
	823

The increased number of deaths took place in Peddoo Naick's Pettah, Triplicane, Chintadrepettah, Choolay, Pursewalkum and Washerman's Pettah. Five out of these localities, as shown in the margin, are those which continued to suffer most severely throughout the quarter, and alone contributed

more than half the total number of deaths from ch registered.

To those acquainted with these portions of Madras surprise will be excited by the notoriety they have att from the constant prevalence of miasmatic diseases, an the excessive mortality which occurs in them during ch epidemics.

Chintadrepettah suffered most severely during the m of July, when 95 deaths were registered. As many deaths occurred in a single day, viz., the 12th of July, 1 10 deaths were also registered on the 11th and 16th same month.

This locality is undoubtedly one of the most unhe districts in the whole of Madras, a fact which may to extent be accounted for by its being encircled by a lo the Cooum river, a geographical feature of a most obje able nature, when looked at in a sanitary point of view one which is peculiar to this portion of the town.

During the season of the year when the Cooum is lowest, the people in the neighbourhood are in the ha collecting shell-fish from its bed, for the purpose of bu the shells into lime.

In doing this the mud of the river is stirred up, to with its accumulated deposits of sewage, and mephitic o set free; thus poisoning the atmosphere of the imm neighbourhood; and generating a fertile source of mias diseases.

The shells are heaped up on the banks of the river, their contents, which have been only partially eaten, a to putrify in the sun. It is to this additional source o ease that Chintadrepettah is peculiarly exposed, while it s in common with many other places, and especially noted above, from bad drainage, and impure water suppl narrow, ill-ventilated, overcrowded streets.

The meteorological condition of Madras during the quarter will be best understood by an inspection of the

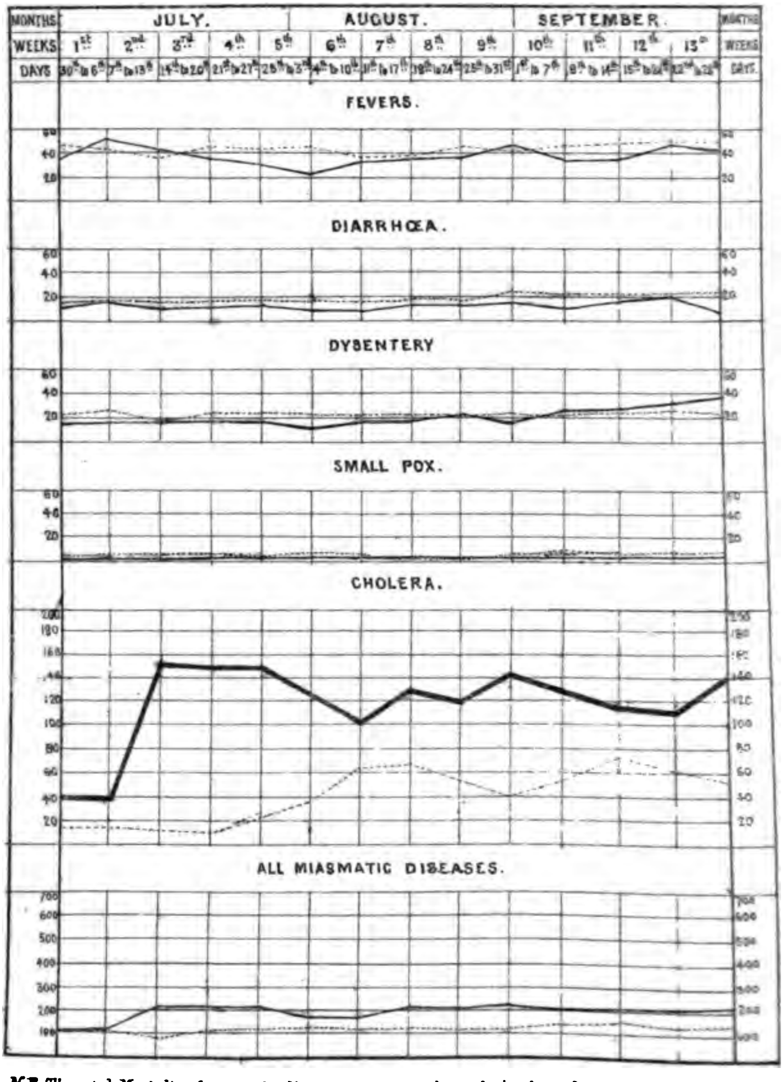
Atmospheric Pressure.—There have been no re markable changes in the rise and fall of the Barometer d the quarter. The mean atmospheric pressure has been 2 reduced to 32° F., which is about the usual average. A fall took place during the 2nd and 7th weeks, bu wave line keeps very much to the usual average.

Temperature.—The temperature throughout the q has been greater than the average, and the wave

[redacted]

DIAGRAM SHOWING THE MORTALITY FROM MIASMATIC DISEASE IN MADRAS,

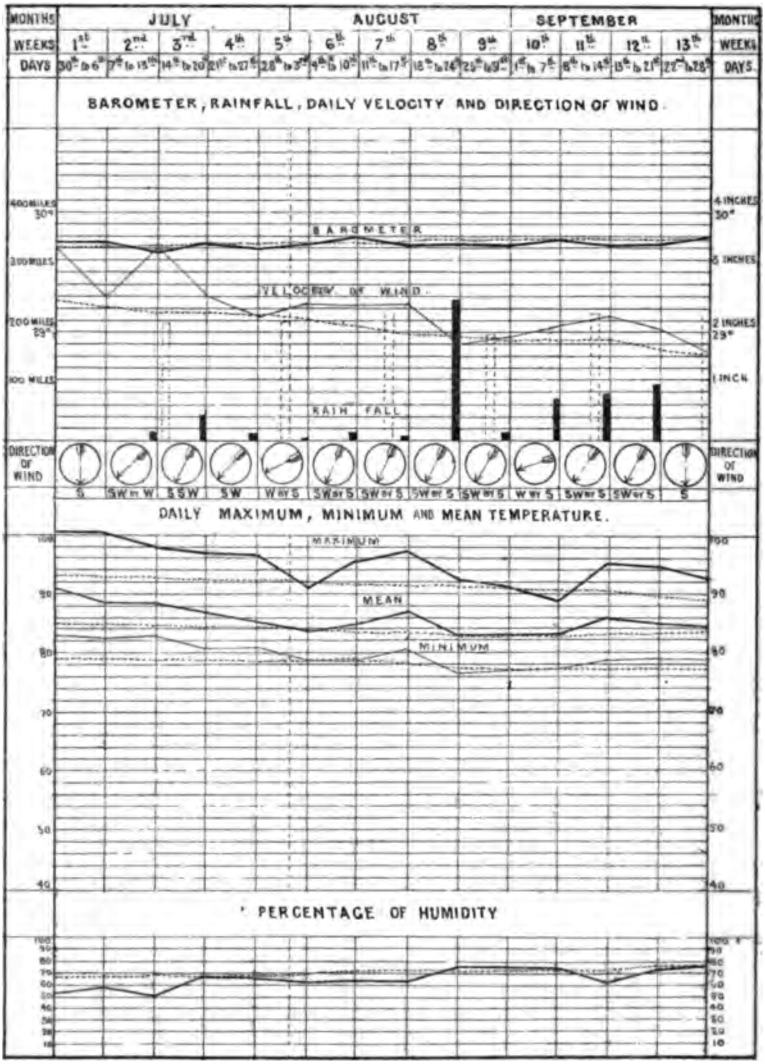
DURING THE 3RD QUARTER _ 1866.



N.B. The total Mortality from each disease during each week is plotted on the perpendicular lines which represent these periods. The horizontal dotted wave lines show the average mortality from each disease for the previous five years.

Alex. Barren, Lithog. Madras, 1866

DIAGRAM SHOWING THE METEOROLOGICAL CONDITION OF MADRAS, DURING THE 3RD QUARTER _ 1866.



N. B. The mean weekly Meteorological elements are plotted on the perpendicular lines. The dotted wave lines show the bimonthly average for twenty years from observations kept at the Madras Observatory.

Alex. Barren Lithog. Madras 1866

mean temperature only once descends below the 20 year average, viz., in the 5th week, ending August 3rd.

The mean temperature for the thirteen weeks has been 85·4° or about 2 degrees higher than the average.

The mean maximum has been 94·8° F., and the mean minimum 79·5°; being 3·8° F. and 1·6° F. respectively, higher than the average.

The temperature falls rapidly to the end of the 5th week of the quarter, when it takes a sudden rise during the 7th week, or that ending August 17th. It falls to the 10th week, suddenly rises during the 11th, and again falls slightly to the end of the quarter. At these periods changes in the increment and decrement of mortality are noticed in this report.

HUMIDITY.—The percentage of humidity has averaged 67 during the quarter, being 4 degrees below the mean.

During July and August the wave line of Humidity runs below the average, and only rises above it during the 9th and 10th weeks, after which it again falls.

RAINFALL.—As in the last quarter so in this, the rainfall has been below the average.

The average rainfall for the third quarter is 12·05 inches. During that which has past, only 7·96 inches have been registered. There is therefore a deficiency of 4·09 inches.

The total rainfall since the 1st of January 1866 is 8·96 inches, which is 10·73 below the average.

It will be observed from the chart that what rain has been registered during the past quarter, fell within the last six weeks, heavy showers occurring during the week ending the 24th August.

VELOCITY AND DIRECTION OF THE WIND.—The direction of the wind has, as usual at this season of the year, fluctuated between the South and Westerly points.

Its daily velocity has averaged 213 miles, which is 32 miles greater than the average.

It will be observed that the mean line of velocity steadily falls throughout the quarter. The greatest average daily velocity took place during the week ending July 13th, when it rose to 302 miles, after which it suddenly fell to 216 during the week ending July 27th. A sudden decrease in the movement of the air took place during the 8th week ending August 24th.

Amongst the various causes which may have influenced the mortality of the past quarter, to one meteorological element

must be attributed a large proportion of the increase in sickness, and that is, the deficiency in rainfall experienced not only in the Madras District, but also generally throughout the Presidency.

The universal drought by leading to the destruction of the crops, and to the deaths by starvation of thousands of heads of cattle, has had the effect of raising the prices of nearly all the necessaries of life to almost famine rates, and, as a natural consequence, the old, the young, the infirm, and in fact all those classes of the population who have been unable to work, if they have not been actually starved, have been predisposed to disease and death, by a reduced amount of food.

The price of labor has not risen with the price of food, and pestilence has gone hand in hand with this (to the poorer classes) practical scarcity of grain.

In examining the chart of mortality from miasmatic diseases, it is to be observed that there are periods at which the wave line of deaths has shown marked changes in its course.

During the first week, in which no marked meteorological changes are noticed, except a sudden decrease in the rate of movement of the air, all the deaths, excepting cholera, show an inclination to rise; but after this time there is a general fall to the 5th week ending August 3rd, in the wave line representing the deaths from the principal miasmatic diseases, cholera being again exceptional.

In the meteorological chart, it is to be observed that this change is exactly that followed by the wave lines of temperature. Miasmatic diseases culminate about the 7th week ending August 17th, so does the wave line of temperature. Other similarities in the curves of these lines may be traced towards the end of the quarter, as has also been noticed in previous reports; but at present it would be unsafe till more extended observations have been made, to attempt any theoretical deductions on the subject in question.

It is interesting to observe how the wave line of cholera mortality seems to run on its course, apparently entirely independent of all meteorological changes. It rapidly ascends in the second week, while other diseases are falling, and does not descend till the 6th week ending August 10th, that is, just a week later than the turning point which has characterized the increment and decrement of other diseases generally, and which has already received notice.

Table Showing the Deaths in Madras, Third Quarter of 1866.

	Europeans.		East Indians.		Hindoos.		Mahomedans.		Total.		General Total of both sexes.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Fevers...	7	0	6	5	208	223	26	25	247	253	500
Diarrhœa	0	5	5	4	65	67	18	8	88	84	172
Dysentery	2	2	1	6	106	128	21	19	130	155	285
Small-pox	1	0	0	0	15	9	2	2	18	11	29
Cholera...	19	13	29	25	660	689	106	114	814	841	1655
Other Miasmatic diseases	0	0	0	1	13	9	3	0	16	10	26
Total Miasmatic...	29	20	41	41	1067	1125	176	168	1313	1354	2667
Total of all other diseases	22	9	33	38	607	509	154	129	816	685	1501
Total...	51	29	74	79	1674	1634	330	297	2129	2039	4168
Mean Mortality of 10 *Third Quarters, from* 1856 *to* 1865.											
Miasmatic diseases	13·1	5·4	15·1	20·3	675·4	624·3	107·2	106·2	810·8	756·2	1567·0
Other diseases	16·0	7·0	25·2	25·5	546·4	499·4	113·4	101·5	701·0	633·4	1334·4
Total...	29·1	12·4	40·3	45·8	1221·8	1123·7	220·6	207·7	1511·8	1389·6	2901·4
Increase	38·5		66·9		962·5		198·7		...		1266·6
Decrease	...		...		...		...		...		...

Table showing the Mortality from Miasmatic Diseases in the last Thirteen Weeks as illustrated by the accompanying diagram.

	July 6th.	July 13th.	July 20th.	July 27th.	Aug. 3rd.	Aug. 10th.	Aug. 17th.	Aug. 24th.	Aug. 31st.	Sept. 7th.	Sept. 14th.	Sept. 21st.	Sept. 28th.	Total.
Fevers	51	43	36	31	23	33	36	38	44	33	37	47	42	494
Diarrhœa	17	11	12	14	9	9	14	11	17	11	18	20	8	171
Dysentery	17	18	18	18	11	19	18	22	18	23	27	31	39	279
Small Pox	1	1	2	4	2	3	5	4	2	1	1	1	2	29
Cholera	40	157	152	150	129	103	128	121	144	130	118	111	140	1623
Other Miasmatic diseases	3	4	2	6	0	1	2	4	0	2	3	0	1	28
	129	234	222	223	174	168	203	200	225	200	204	210	232	2624

Average of the Corresponding Weeks for 5 previous years.

Fevers	41·2	37·6	43·4	41·0	42·6	37·4	39·2	42·6	41·8	45·6	48·0	48·4	48·2	557·0
Diarrhœa	16·2	19·4	18·8	19·0	19·4	18·4	19·4	18·8	24·2	21·4	22·8	22·0	24·4	264·2
Dysentery	24·0	19·2	21·0	22·2	22·6	21·4	21·6	22·4	23·0	21·8	27·2	29·4	25·2	301·0
Small Pox	4·2	4·0	4·6	3·2	4·6	4·4	4·0	2·4	3·4	6·0	4·4	4·0	3·8	53·0
Cholera	17·0	14·0	11·6	22·2	35·8	64·4	69·4	56·0	40·6	53·6	74·8	61·6	54·4	575·4
Other Miasmatic diseases	4·0	2·6	4·2	3·2	5·2	4·2	3·0	4·2	2·6	3·8	3·4	2·6	2·0	45·0
	106·6	96·8	103·6	110·8	130·2	150·2	156·6	146·4	135·6	152·2	180·6	168·0	158·0	1795·6

Mean Meteorological Observations for the past 13 *Weeks.*

	July 6th.	July 13th.	July 20th.	July. 27th.	Aug. 3rd.	Aug. 10th.	Aug. 17th.	Aug. 24th.	Aug. 31st.	Sept. 7th.	Sept. 14th.	Sept. 21st.	Sept. 28th.	Total.
Barometer reduced to 32° F.	29·753	29·686	29·704	29·704	29·737	29·807	29·734	29·745	29·756	29·782	29·752	29·761	29·809	29·749
Mean Maximum Temperature	100·9	98·3	97·7	96·8	91·9	95·5	97·0	92·5	91·5	89·0	94·7	94·3	92·7	94·8
Do. Minimum do	82·8	82·7	80·3	80·9	78·8	78·6	80·3	76·4	77·5	77·9	79·2	79·4	78·7	79·5
Mean Temperature..........	88·6	88·4	87·0	85·7	83·7	85·1	86·5	83·4	83·4	82·7	85·6	85·3	84·7	85·4
Do. Humidity..............	59	54	66	66	64	66	65	75	75	73	67	70	72	67
Prevailing Wind............	S.	S. W. by W.	S.S.W.	S. W.	W. by S.	S. W. by S.	S. W. by S.	S. W. by S.	S W. by S.	W. by S.	S. W. by S.	S. W. by S.	S.	S. W. by S.
Mean Velocity in Miles.........	245	302	247	216	228	222	24	160	176	193	203	188	14·3	21·396
Rainfall......................	0	0·18	0·41	0·83	0·07	0·70	0·17	2·35	0·93	0·69	0 79	0·84	0	7·96

Table showing the Mean half Monthly Meteorological condition of Madras for 20 *years past.*

	Half Month ending 15th July.	Half Month ending 31st July.	Half Month ending 15th August.	Half Month ending 31st August.	Half Month ending 15th September.	Half Month ending 30th September.	Total.
Barometer reduced to 32°F.........	29·708	29·721	29·749	29·753	29·763	29·796	29·746
Mean Maximum Temperature......	92·6	91·9	91·6	90·3	90·5	89·1	91·0
Do. Minimum do	78·8	78·4	78·1	77·7	77·8	77·1	77·9
Mean Temperature..................	84·3	83·9	83·5	82·8	82·9	82·2	83·2
Mean Humidity......................	69	69	71	73	72	76	71
Prevailing Wind.....................	S. W.	S. W. by W.	S. W. by S.	S. W.	S. W. by S.	S. S. W.	S. W.
Mean Velocity in Miles............	215	207	182	175	168	140	181
Rainfall............	1·93	1·98	2·08	1·78	2·08	2·20	12·05

METEOROLOGICAL RESULTS *from the Madras Observatory Register, for the month of July* 1866.

July 1866.	Barometer reduced to 32°.	Standard Thermometers.				Percentage of humidity.	Wind.		Depth of rain.	GENERAL REMAR
		Observed extremes.		Daily means.						
		Maxim.	Minim.	Dry.	Wet.		Prevailing direction.	Daily velocity.		
	Inches	°	°	°	°	per cent.		Mls.	Ins.	
1	29·766	101·2	83·5	89·2	76·6	57	S.	267	....	Fine, with passing cl
2	29·786	97·8	81·7	89·4	77·0	58	S. S. E.	209	....	Passing clouds.
3	29·786	100·3	84·2	89·9	77·5	58	S. by E.	225	....	Cloudy.
4	29·746	102·2	80·9	87·9	76·4	59	S. by W.	265	....	Chiefly overcast.
5	29·699	101·0	83·3	88·1	76·2	58	S. S. W.	275	....	Hazy clouds.
6	29·726	101·3	83·3	86·5	76·7	65	S.W by S.	249	....	Cloudy.
7	29·719	97·9	81·9	88·5	77·0	60	S.	310	....	Passing clouds.
8	29·688	97·3	82·7	89·9	76·3	54	S. by W.	315	....	do.
9	29·716	100·1	82·0	84·8	76·4	69	S. W.	272	0·17	Cloudy. Shower a
10	29·674	98·1	80·9	89·0	73·1	47	W.	304	....	Chiefly overcast.
11	29·631	96·9	84·0	89·6	73·0	46	W. by N.	313	....	Overcast.
12	29·666	95·9	83·1	87·9	72·2	47	W. by N.	340	....	do.
13	29·711	102·1	84·2	89·4	75·3	53	W. S. W.	262	0·01	Passing clouds. Light sl 6½ P.M.
14	29·757	101·1	83·3	88·3	76·7	59	S. S. W.	231	....	Fine day ; cloudy ni
15	29·739	98·4	81·6	87·1	77·9	66	S.	218	0·07	Rain at ½ A. M. Chiefly
16	29·693	192·2	76·0	84·0	78·7	79	S.	255	0·34	Rain before sunrise. cloudy.
17	29·707	91·8	78·9	84·9	78·2	75	S. by W.	210	....	Cloudy.
18	29·703	99·7	80·8	87·8	78·1	65	S. W.	249	....	Fine, with passing cl
19	29·708	100·7	80·8	89·3	76·0	55	W.S. W.	257	.....	Passing clouds.
20	29·691	100·2	80·7	87·3	76·2	61	S.W	311	......	Cloudy.
21	29·676	100·1	83·3	84·8	76·7	70	S. W.	285	0·11	Cloudy. Shower at
22	29·674	96·5	81·0	86·2	76·2	64	SW by W	210	....	Cloudy.
23	29·709	100·5	83·4	88·0	76·3	50	S. W.	234	....	Chiefly overcast.
24	29·714	100·0	83·8	88·9	77·0	59	SW by W	225	....	Cloudy.
25	29·704	94·0	80·0	84·7	77·3	72	S W by S	203	0·30	Rain at 1 A. M. and Thunder and lightni
26	29·708	92·0	76·6	82·7	75·8	73	S. W by S	165	0·09	Rain before 1 A.M. O
27	29·740	94·7	78·4	84·8	74·7	63	W. by S.	187	0·33	Overcast. Rain from 5
28	29·733	92·0	78·8	83·6	74·3	65	W. S. W.	235	....	Overcast.
29	29·777	92·3	77·6	84·6	74·5	63	W. by S.	220	0·02	Overcast, with slow
30	29·758	88·2	79·7	81·4	73·1	68	W. by N.	260	0·03	Overcast. Showers at 3
31	29·721	88·4	77·4	83·1	74·4	67	W. by N.	169	....	Overcast.

The Standard Barometer and Thermometers are read at 10 A. M., 4 P. M. and and the Daily Means are obtained by the application of hourly corrections, deduc twenty years' observations. The Cistern of the Barometer is 27 feet above the le Sea, and the Receiver of the Rain-gauge is three feet from the ground. The W Rain registered are for the current civil day—from midnight to midnight.

N. R. POGSON, Government Astr

METEOROLOGICAL RESULTS *from the Madras Observatory Register, for the month of August,* 1866.

Aug	Barometer reduced to 32°.	Standard Thermometers. Observed extremes. Maxim.	Minim.	Daily means. Dry.	Wet.	Percentage of humidity.	Wind. Prevailing direction.	Daily velocity.	Depth of rain.	GENERAL REMARKS.
	Inches.	°	°	°	°	per cent.		Mls.	Ins.	
1	29·713	88·8	77·8	81·7	72·7	65	NWbyW	213	.....	Overcast.
2	29·678	96·1	79·1	85·6	73·8	58	W. S. W.	246	0·02	Overcast. Shower at 6½ P.M.
3	29·737	97·2	81·0	85·7	76·0	65	S. by W.	256	....	Chiefly cloudy.
4	29·813	97·4	79·0	86·0	76·2	65	S.	186	.....	Passing clouds.
5	29·868	96·1	81·5	86·7	78·5	70	S.W.byS.	196	0·25	Cloudy. Rain chiefly about 11 P.M.
6	29·882	86·3	76·9	82·0	75·5	74	S. W.	161	.....	Overcast.
7	29·862	91·5	77·7	84·6	75·0	64	W. S.W.	178	.. ....	Chiefly overcast.
8	29 776	97·0	76·9	84·6	75·1	64	S. S. W.	219	....	Passing clouds.
9	29·721	99·8	76·7	86·8	75·3	59	S. W.	287	....	Fine, with passing clouds.
0	29·724	100·1	81·6	85·2	75·6	65	S.W.byS.	329	0·45	Passing clouds. Rain from 4½ to 7½ P.M.
1	29·704	95·9	79·0	85·4	76·1	66	S. by W.	246	....	Fine with passing clouds.
2	29·692	99·1	81·2	88·1	75·4	56	W. by S.	296	0·02	Passing clouds. Showers at 8½ and 10¾ P.M.
3	29·684	96·2	82·5	87·8	77·7	64	SW byW	294	0·02	Overcast. Light rain at 7¾ P.M.
4	29·720	98·2	80·4	85·3	76·3	67	S.W.by S	259	0·09	Chiefly overcast, Light showers after 4 P.M.
5	29·778	98·3	78·6	85·0	77·1	70	S S. W.	225	0·04	Chiefly cloudy. Showers at 5¾ P.M.
6	29·774	95·7	79·9	86·8	77·0	65	S. by W.	203	....	Fine, with passing clouds.
7	29·783	95·6	80·8	87·0	77·6	66	S. by E.	198	....	Fine, with passing clouds.
8	29·802	93·8	77·6	85·3	76·5	68	S.	182	....	Passing clouds.
9	29·773	95·6	75·2	85·1	75·7	66	W. S. W.	165	0·06	Rain at 5 A.M. Chiefly cloudy.
0	29·737	96·7	80·6	86·4	75·9	62	S.W.byS.	141	....	Cloudy.
1	29·726	94·5	78·4	83·8	77·2	75	S. S. W.	169	0·10	Shower at 7½ A.M. and 4¼ P.M. Cloudy.
2	29·744	89·7	74·0	81·3	76·7	82	W. S. W.	198	0·82	Rain between 2 and 9 A.M. Chiefly overcast.
3	29·734	88·9	72·2	80·9	77·8	88	S. W.	139	1·06	Rain from 4 to 8 A.M. Cloudy.
4	29·699	88·3	77·0	81·0	77·3	85	S. by W.	126	0·31	Overcast. Rain commenced at 11½ P.M.
5	29·693	87·0	74·6	80·7	76·4	83	SW by W	163	0·42	Overcast. Rain until 7 A.M. and after 10¾ P.M.
6	29·747	90·1	75·5	82·2	76·6	78	SW by W	196	0·27	Rain until 4 A.M. Cloudy.
7	29·750	93·9	77·6	82·3	75·7	74	S. W.	233	....	Chiefly cloudy.
8	29·703	91·8	76·9	83·9	76·9	73	S.W.by S	186	0·05	Chiefly cloudy. Shower at 3¾ P.M.
9	29·756	94·0	79·8	85·2	77·2	70	S. S. W.	179	....	Passing clouds.
0	29·817	91·4	79·5	85·2	77·9	73	S. by E.	139	0·10	Partly fine. Rain at 5 P.M.
1	29·826	92·0	78·8	84·5	78·3	76	S. S. W.	133	....	Chiefly cloudy.

The Standard Barometer and Thermometers are read at 10 A.M., 4 P.M. and 10 P.M., the Daily Means are obtained by the application of hourly corrections, deduced from nty years' observations. The Cistern of the Barometer is 27 feet above the level of the , and the Receiver of the Rain-gauge is three feet from the ground. The Wind and n registered are for the current civil day—from midnight to midnight.

N. R. POGSON, Government Astronomer

METEOROLOGICAL RES

Register, for th

September 1866.	Barometer reduced to 32°.	Standard Thermometers. Observed extremes. Maxim.	Minim.	Daily means. Dry.	Wet.
	Inches.	°	°	°	°
1	29·810	84·0	79·1	82·2	74·
2	29·804	84·3	76·9	79·7	74·
3	29·768	84·8	77·9	80·7	74·
4	29·727	91·3	78·0	82·3	74·
5	29·765	89·6	76·7	83·6	75·
6	29·806	94·0	78·1	85·0	76·
7	29·795	95·1	78·6	85·6	78·
8	29·757	95·0	80·7	87·6	75·
9	29·740	94·3	79·7	86·0	76·
10	29·760	95·6	80·6	85·6	70·
11	29·783	95·2	79·0	85·5	76·
12	29·729	94·3	76·7	85·7	77·
13	29·739	95·1	80·5	84·2	78·
14	29·754	93·4	76·9	84·7	75·
15	29·739	95·1	79·7	86·9	75·
16	29·753	94·5	79·8	87·2	74·
17	29·725	94·3	80·3	85·4	75·
18	29·739	96·2	80·3	85·5	77·
19	29·781	95·9	80·4	85·5	79·
20	29·794	95·0	81·0	85·9	79·
21	29·795	88·9	74·0	80·9	77·
22	29·792	92·0	78·4	84·3	78·
23	29·846	92·0	79·3	85·0	77·
24	29·851	92·3	79·5	84·3	77·
25	29·804	94·7	78·2	83·9	77·
26	29·788	91·9	77·6	84·6	76·
27	29·806	93·3	77·5	84·9	77·
28	29·776	92·6	80·3	85·9	77·
29	29·756	95·0	80·4	84·7	78·
30	29·740	93·9	77·9	85·1	77·

The Standard Barometer and T
and the Daily Means are obtained b
twenty years' observations. The C
Sea, and the Receiver of the Rain-g
Rain registered are for the current c

PART IV

MEDICAL INTELLIGENCE.

Civil Dispensaries.

PUBLIC DEPARTMENT.

Proceedings of the Madras Government, 5th October 1866.

Read the following :—

No. 68. MINUTE by the Right Honorable the PRESIDENT dated 20th September 1866.

I took occasion, on my recent passage through Coimbatore, to visit the Civil Dispensary at that place, and I was extremely concerned to remark the indigence, neglect and disorder which prevail in that Institution.

2. There were only five in-door patients, one of whom was a woman with her infant child. This state does not at all correspond to the probable necessities of a place possessing between twenty and thirty thousand inhabitants. It implies a want of confidence on the part of the population, and a want of efficiency on the part of the establishment.

3. The furniture of the male Ward, such as bedsteads, pillows, coverlids, &c., &c., was extremely dirty and deteriorated. The body of one patient, suffering from a fracture of the thigh, was filthy in the extreme. The rest were probably little better. The room itself was dirty. The Medical Stores were slovenly or ill-arranged. The registers were imperfectly kept, or not written up. The single female patient was lying on the floor, in an apartment partly filled with rubbish and broken furniture, more like a beggar in a Chuttrum than a female patient in a Hospital under civilized and Christian superintendence.

4. I was shown an empty room, which, I was told, belonged to the sick of the Police; but there were no Police patients on the premises, though about twenty men of the force were off duty on account of illness, and were treated in their Lines—a system which cannot, I imagine, be advantageous either for the sick or the Physi-

cian. I pass over this at present, for I understand that difficulties are attached to the treatment of the Police in Civil Dispensaries. Those difficulties ought not to exist.

5. My reflections on the discreditable state of the Dispensary were met by Assistant Surgeon Roberts with the simple assertion that its resources were restricted to the sum of Rupees 70 per mensem, the interest of Rupees 20,000, originally subscribed by the public at Coimbatore for the support of the Institution; and reference to the monthly accounts of the Hospital showed that the sum referred to was punctually disbursed for the most indispensable objects.

There is no current subscription whatever at Coimbatore for the support of the Hospital.

I do not think that the poverty of the Institution exonerates the Assistant Surgeon and the Native Apothecary from the charge of indifference and negligence in the discharge of their duties; but the Assistant Surgeon has recently come to the Station, and the Apothecary has, I believe, applied for his retirement. There is no doubt that a want of resources, which stimulates some minds to additional exertion, has a depressing effect upon others. I am willing, on this occasion, to take a considerate view of the conduct of Mr. Roberts, and I prefer to look to the improvements of the future, rather than to the errors of the past.

6. In my recent tour to the North, I have received an unsatisfactory impression of the state of the Civil Dispensaries. I may have been unlucky; but I fear that these establishments are on a low footing in general, and that there is a certain want of professional zeal and pride on the part of the Medical Officers of all ranks. This defect requires to be corrected by the admonitions and encouragements of the Medical Inspectorate, and by a livelier interest in the welfare of the Dispensaries on the part of the Members of the Civil Service and of the Native Community.

7. The Dispensaries receive their Medical Officers and their Medicines from Government; for all other objects they depend on private subscriptions. It is, therefore, impossible to enforce an absolutely uniform system of apparatus and furniture; much will still depend on local circumstances.

8. I think, however, that the Principal Inspector General should issue a Circular Instruction to his Medical Subordinates, stating the description of bedding, hospital furniture, and hospital dress, which it is *desirable* to have in the Civil Dispensaries for men and women, enforcing a higher view of professional duty than that which has recently prevailed, and enjoining the Medical Officers to promote the

contemplated improvements by every means in their power, in conjunction with the Civil Officers of Government.

9. With respect to the particular case of the Dispensary at Coimbatore, I wish a copy of this Minute to be forwarded to the Collector, with an expression of opinion on the part of Government that his influence with the people of the town might properly be employed with the view of raising (1) a subscription of about Rupees 1,000 to renew and impreve the furniture of the Hospital, and (2) a current monthly subscription of about Rupees 100 to maintain it in a state of efficiency and decency.

10. Such moderate efforts on the part of the Native Community are not without example. At Cuddapah, I understand that there is a model Civil Dispensary. There is no reason to suppose that the people of Coimbatore are deficient in liberality. The original subscription for the endowment of the Dispensary reflects credit on them, and they would probably obey an impulse judiciously given by the local authority.

(Signed) NAPIER.

No. 69. ORDER THEREON, 5th October 1866, No. 1018.

Ordered that a copy of the foregoing Minute of the Right Honorable the President, be forwarded to the Principal Inspector General, Medical Department, and the Collector of Coimbatore.

2. Dr. Roberts' recent appointment may be accepted as in some degree an excuse for the miserable condition of the Dispensary; but he must clearly understand that the Government expect much greater attention to the Institution on his part, for the future.

3. The Principal Inspector General will take due notice of the Apothecary's conduct.

4. The Principal Inspector General will adopt the measures proposed in paragraph 8 of His Excellency's Minute, and will ensure the periodical inspection of these Institutions wherever they exist. The reports of these inspections should be sent to the Principal Inspector General (copies being furnished to the Collector) as soon as practicable and, at the close of each year, they will be duly noticed by him in his annual report to Government.

5. The Collector of Coimbatore will use his influence with the people of Coimbatore, with the view of raising funds, as suggested in paragraph 9 of His Excellency's Minute.

6. These Proceedings will be circulated to all Collectors, for their information.

7. There can be no question of the great amount of good which Civil Dispensaries are calculated to work, if they are properly managed; but the success of such Institutions depends largely on the interest taken in them, and the supervision exercised over them, by the Public Functionaries, European and Native, of the places where they are established. The Government trust that the circulation of these papers will serve to remind their Officers of the obligation they are under to exert their influence in properly maintaining, as well as originating, such useful Institutions.

The following circular has been issued with regard to the above:—

Office of Principal Inspector General, Medical Department, Fort Saint George, 13th October 1866. From the Secretary, Principal Inspector General, Medical Department, Fort Saint George, to the Deputy Inspector General of Hospitals, — Division.

Sir,—In forwarding the accompanying Proceedings of the Madras Government, for your information and guidance, I am desired by the Principal Inspector General to make the following observations in regard to the provision of Hospital furniture, clothing, &c., for Civil Dispensaries, and to request that you will call the attention of all Medical Officers and Subordinates in charge of those Institutions to the following points:—

1. *Hospital Cots.*—Should be uniform in size and shape. They are best constructed of iron. Periodical painting of the iron work with *coal tar*, and drying of the same in the sun is the best mode of preserving these cots free of vermin.

For all ordinary cases amongst Natives the iron cots should be boarded; but it is advisable that, for special cases, a few cots should be provided with coir mattrasses.

2. Hospital bedding and clothing should ordinarily consist of the articles laid down in paragraph 8, Section XI., Medical Code. The quantities to be kept in store must vary with the average number of sick. Instead of Cumblies or country blankets, the Principal Inspector General recommends the use of red blankets of European make, as being both more sightly in appearance and more durable.

3. As a rule, patients' own clothing on admission should be taken from them, washed, and ticketed before being placed in the Store-room, and finally returned to them on leaving hospital. With caste patients or persons who object to use hospital clothing, means

should be adopted to ensure cleanliness and change of attire as often as may be needed.

4. The scale of diet, which has recently been sanctioned for the use of Native and East Indian patients in the Madras General Hospital, might be appropriately introduced in some of the Mofussil Civil Dispensaries, provided that the Committees of Management see no objection on the score of expense. The diet table is appended.*

5. The rule laid down in paragraph 11, Section XI, Medical Code, would appear to have become in most instances a dead letter.

"11. As it will conduce greatly to the "regularity, order, and efficiency of these "hospitals to be frequently visited by the "chief local authorities, Judges and Collec- "tors and Magistrates at Civil Stations, "and Commanding Officers at Military "Cantonments are requested to make occa- "sional inspections, and institute enquiries "into the comfort and diet of the patients, "attending to any complaints that may be "made, and bringing to the notice of the "Surgeon any irregularities or inattention "which may be observed."

You will be so good as to ascertain and note in your Inspection Reports of Civil Dispensaries how far it is carried out. To enable you the better to do this, you will be so good as to direct the Medical Officer of each Institution within your circle, to open a "Visitors' book," in which Government Officials and other visitors may record their observations. You will note the tenor of these remarks in your Annual Inspection Reports.

On Feeding Cattle upon the Prickly Pear.

F. DAY, ESQ., F. L. S., F. Z. S., &c., has forwarded us the following :—

As an attempt is now being made in Madras and elsewhere to utilise the prickly pear hedges by employing the leaf as food for cattle, I beg to draw attention to the following observations in the *Practical Mechanic's Journal* for Sept. 1st, 1866.

"Those who have been in Asia Minor or Sicily will have seen the blind men by the way sides, whose eyes have been destroyed by pruning and gathering the prickly pears *(Opuntias)* whose microscopic spines, borne upon the wind, are not sharper than are the edges of particles of ground glass."

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* See pages 283, 284 of vol. ix of this Journal.—ED. M. Q. J.

Order of the Madras Government on the Report on Vaccination for 1865.

PUBLIC DEPARTMENT.

Proceedings of the Madras Government.

Read the following letter from the Principal Inspector General, Medical Department.

Here enter 11th May 1866, No. 169.

ORDER THEREON, 22nd September 1866, No. 959.

1. With the letter above recorded the Principal Inspector General, Medical Department, submits the Report of the General Superintendent of Vaccination, showing the results of the operations of the Vaccine Department during 1865.

2. The Department was re-organized during the year, and as the new arrangements were not fully completed until the last quarter, the decrease in the number of persons vaccinated, as compared with that of 1864, is satisfactorily accounted for.

1864...	3,11,587.
1865...	1,91,394.

3. The present Returns, moreover, may be accepted as more trustworthy than those of former years.

4. The Government concur in the advantages of the measure proposed by the General Superintendent, that each Deputy Superintendent should be supplied with a box of medicines for the purpose of affording medical aid to applicants on their tours, provided, of course, that this is kept in due subordination to the proper duties of these Officers. This arrangement was always intended, as stated in paragraph 3 of the letter to the Supreme Government, dated 17th August 1864, No. 939, and will be carried out at once. The Government do not, however, see the necessity of attaching a lascar to each Deputy Superintendent, as one of the two Peons attached to each Vaccine party can carry the medicine chest.

5. The unsuitableness of the building in Chintadrepettah as a Vaccine Depôt, as represented by the General Superintendent in paragraph 37 of his report, is very apparent. The building serves also as a Dispensary, and as Mr. Shaw is of opinion that it might be now closed both as a Dispensary and as a Vaccine Depôt, the measure will be carried out as soon as practicable, and the patients transferred to the Out-patient Department of the General Hospital.

6. The Government fully approve of the proposition for extending the benefits of Vaccination through the aid of the local Municipal Associations. The attention of the Presidents of these bodies will accordingly be drawn to the subject.

7. The proposals of Dr. Shortt and Mr. Shaw for the partially

re-modelling and strengthening the Vaccine Department, so as to render it more equal to the requirements of the Presidency, is now engaging the attention of Government, and renders it unnecessary for them, on this occasion, to notice Mr. Shaw's remarks on the expediency of granting pensions to the Vaccinators, on the comparative inefficiency of the Hospital Assistants, &c.

8. In concluding this brief review of the operations of the year, the Government deem it only due to Dr. Shortt to record their approval of his judicious arrangements in organizing and working his staff of Vaccinators, and his own zealous exertions in supervising their work.

9. The Government also notice with pleasure the efficient aid afforded to Dr. Shortt by the several Deputy Superintendents.

New Rules for the Supply of Surgical Instruments to Medical Officers.

Fort St. George, 16th October 1866.

Medical Department, Surgical Instruments.

No. 379 of 1866.—In assimilation with the practice in Bengal, the Governor in Council is pleased to direct the substitution of the following rules for paragraph 41, Section V, page 59 of the Madras Medical Code, with a view to regulate the issue from the Government Stores, of Surgical Instruments to Civil and Military Hospitals.

2. Henceforth these Instruments will be attached to the charge and not to the individual Medical Officer by whom the charge is held. They will be supplied from the Public Stores on indents countersigned by the Administrative Medical Authorities as follows :—

To a full Regiment of British Cavalry or Infantry ...... one Capital or complete case of Field Instruments and two pocket cases.

„ Head Quarters of Brigade, Royal Artillery......	One Capital and one pocket Case.
„ Battery of Horse Artillery............................	
„ Light Field Battery of Artillery..........	
„ A full Regiment of Native Cavalry or Infantry..........	
„ Wings of Regiments, whether European or Native, when detached from Regimental Head Quarters..........	
„ Garrison Batteries of Artillery, when in charge of a separate Medical Officer................................	
„ Detachment of Troops in charge of a Medical Officer...	
„ Jails, Civil Hospitals, and Dispensaries..................	

3. These Instruments will be kept in the Surgery, subject to the rules now in force, to secure the condition and sufficiency of all other Surgical Equipment, &c., belonging to Hospitals. This will necessitate their periodical examination by inspecting Medical Officers, as heretofore; their inclusion in the periodical Stock-taking, and examination in common with all other Medical Stores; and the transmission half yearly of a return of the instruments to the Medical Examiner.

4. On all occasions involving change of duties, the relieved Medical Officer is to obtain triplicate receipts, indicating the nature, completeness, and general condition of the instruments he has made over to his successor, one copy being forwarded to the Medical Examiner, one lodged in the Hospital records, and one retained as his own voucher.

5. On the return to Regimental Head Quarters of Wings of Regiments and Detachments; on relinquishing charge of a Garrison Battery to another Medical Officer having a charge with like instruments assigned to it; and, generally, on the completion of all duties which call for the maintenance of a separate set of instruments, the Medical Officer will return the instruments to the Presidency or Divisional Medical Storekeeper, from whom receipts in duplicate will be obtained, one to be forwarded to the Medical Examiner, the other to be retained as his voucher.

6. When instruments may be damaged or lost, the value of such instruments will be recovered from the Medical Officer responsible for their safe custody, unless the injury or loss is explained (through the Inspecting Medical Officer) to the satisfaction of the Principal Inspector General, Medical Department. In the case of loss satisfactorily accounted for, the sanction of Government to the instruments being written off the returns, must be obtained.

7. Instruments becoming unserviceable or requiring repair, are to be returned into the Public Stores; the sanction of the Inspecting Medical Officer being requisite for this transfer, as well as for the issue on the Indent of the Executive Medical Officer of fresh instruments from the Government Stores. These Indents are to be furnished in duplicate. One copy for Store record, the other to be forwarded to the Medical Examiner.

NOTE.—A separate printed copy of the above order is furnished with each number of the present issue of this Journal, for the convenience of Medical Officers, who can gum the sheet into its proper place in their copies of the Medical Code.—ED. *M. Q. J.*

Organization of the Administrative Medical Staff.

In continuation of G. G. O. Nos. 1061 and 1062, dated 23rd December 1864,* and under instructions from the Right Hon'ble the Secretary of State for India, concurred in by the Hight Hon'ble the Secretary of State for War, the Governor General in Council is pleased to notify that the following arrangements for the organization of the administrative staff of the British and Indian Medical Services in this country, have been sanctioned by Her Majesty's Government :—

British Medical Service.—The staff of the Medical Department of the British Forces, will be composed as follows :—

BENGAL :

1 Inspector General,
† 6 Deputy Inspectors General.
‡ 2 Staff Surgeons Major.

MADRAS :

1 Inspector General.
§ 3 Deputy Inspectors General.
‖ 1 Staff Surgeon Major,

BOMBAY :

1 Inspector General.
¶ 3 Deputy Inspectors General.
** 1 Staff Surgeon Major.

The staff of the Inspector General in Bengal will consist as at present, of a Secretary and Statistical Officer ; and that of the Inspectors General in the Madras and Bombay Presidencies, of an Assistant Surgeon as Secretary and Statistical Officer in one.

The Inspectors General of the British Medical Service in the three Presidencies will no longer be considered as attached to Army Head Quarters, but will be directly subordinate to the Government of India, or to the Government of the Presidency to which they belong ; and their offices will henceforward, in like manner with those of the heads of the Indian Medical Department, be at the seat of Government.

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* See pages 444 to 455 of Vol. viii. (No. 16) of this Journal.

Circles.

† Presidency.
Lucknow.
Meerut.
Lahore.
Gwalior.
Peshawur.
‡ Allahabad.
Umballa.

Circles.

§ Presidency.
Bangalore.
Secunderabad.
‖ Burmah.
¶ Presidency.
Poona.
Mhow.
** Scinde.

Although in future these Officers will be directly subordinate to the Government, and no longer attached to Army Head Quarters, they will continue to furnish such information and returns on all points connected with the health of the British Troops as may be required of them by the Commanders-in-Chief of their respective Presidencies, and generally to obey such instructions as may be issued by those authorities, subject, in each case, to the approval of the Government of India, or of the Government of Fort St. George or Bombay.

The full superintendence—professional and economic—of all British Hospitals, will devolve upon the administrative staff of the British Medical Service, and they will be guided by the rules and practice in force with the Indian Medical Administration, and will, in like manner, be directly responsible to the Government of the Presidency in which they may be serving.

When the necessary promotions and appointments have been made to complete the administrative staff of the British Medical Service now sanctioned for India, arrangements will be made for the re-distribution of the duties between the two Departments—British and Indian.

Indian Medical Department.—The administrative staff of the Indian Medical Department, will be composed as follows :—

BENGAL :

1 Inspector General.
* 11 Deputy Inspectors General.

MADRAS :

1 Inspector General.
† 6 Deputy Inspectors General.

BOMBAY :

1 Inspector General.
‡ 4 Deputy Inspectors General.

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* *Circles of Superintendents,*—

Barrackpore.
Dacca.
Dinapore.
Allahabad.
Lucknow.
Saugor.
Gwalior.
Meerut.
Sirhind.
Lahore.
Peshawur.

† Circles of superintendence to be laid down by the Government of Fort St. George.

‡ Circles of superintendence to be laid down by the Government of Bombay.

The staff of the Inspectors General of the Indian Medical Department will consist in Bengal, as at present, of a Secretary and a Statistical Officer; and in the Madras and Bombay Presidencies, of a Medical Officer as Secretary and Statistical Officer in one.

The Inspectors General of both the British and Indian Medical Service in Bengal will receive a consolidated salary of Rupees 2,700 per mensem, and those in the Madras and Bombay Presidencies, the existing salary of that grade, *viz.*, Rupees 2,500 per mensem. The Deputy Inspectors General in all the Presidencies will receive the consolidated salary of Rupees 1,800 per mensem, as at present fixed for that grade, and the four Staff Surgeons Major, a consolidated salary of Rupees 1,400 per mensem.

The Secretaries to the Inspectors General, and the Statistical Officers in Bengal will receive a staff salary of Rupees 700 and 600 per mensem, respectively; and the Secretaries and Statistical Officers in the Madras and Bombay Presidencies, a staff salary of Rupees 700 per mensem.

These staff salaries are now fixed, subject to the approval of the Right Hon'ble the Secretary of State, and will be granted in addition to the unemployed scale of pay laid down in paragraph 29 of Sir C. Wood's Despatch No. 340 of the 7th November 1864, published in G. G. O. No. 1060 of 23rd December 1864.

The administrative staff of the Indian Medical Department will, so soon as that of the British Medical Service has been completed, be relieved of all control over the Hospitals of British Troops.

In other respects their duties are unchanged.

Although from the changes which have been recently introduced affecting the pay, pension, and promotion of the Indian Medical Service, it has, in all its grades, derived considerable benefit; yet, with a view of rendering the effect of the reduction now proposed in the number of the administrative staff as little as possible prejudicial to the interests of the Officers more immediately concerned, Her Majesty's Government has resolved that the Officers now holding the positions of Inspector General and Deputy Inspector General of the Indian Service shall be permitted, to the extent of the proposed reduction, to retire, when they think proper, upon the rate of pension severally allotted to those grades in paragraphs 36 and 37 of Sir C. Wood's Despatch No. 340, dated 7th November 1864, published in G. G. O. No. 1060 dated 23rd December 1864, without reference to the time served in those grades.

Vacancies caused by such retirements or by ordinary casualties subsequent to the 1st October 1866, the date of the receipt of the instructions of Her Majesty's Government hereby notified, will be

allowed to lapse until the establishment is brought to the strength now laid down.

The title of Principal Inspector General will be discontinued in all the Presidencies, when present permanent incumbents holding that designation vacate their offices.

We congratulate our brethren of the British Medical Service on the very great advantages which they obtain under the above "Organization." We say nothing here as to the policy of maintaining separate British and Indian Medical Services, but, accepting the position, we think it a simple matter of justice that the British Service should have its own Administrative Staff.

As regards the Madras Presidency (in which our interest chiefly lies) the new organization gives a great preponderance of Inspectorial Ranks to the British Medical Service.

A reference to the Madras Army List for October shows that, excluding the present Deputy Inspector General, there are 74 British Medical Officers in this Presidency, and the above G. G. O. fixes the Administrative Staff at 5, inclusive of the Staff Surgeon-Major. And the same list shows that there are 173 Medical Officers of the Indian Service, exclusive of the present Inspectors and Deputy Inspectors General, and the G. G. O. fixes the future number of the latter at 7.

There are two or three ways in which the proportion of Inspectorial Ranks to Executive Officers may be calculated.

1st.—Roughly, it may be said, that 5 to 74 gives 1 Administrative to every 15 Executive Officers, in the British Service; and 7 to 173 gives 1 Administrative to nearly every 25 Executive Officers in the Indian Service.

2nd.—The Staff Surgeon Major may be said not to be entirely an Administrative Officer, so that 4 to 74 gives 1 Administrative to every 18·5 Executive Officers in the British Service; the proportion in the Indian Service remaining as above, 1 to 25 nearly.

3rd.—The Inspectors General may be considered as holding appointments of a fixed or office nature, and then the proportion will be, 3 to 74 or 1 Deputy Inspector to every 23·66 Executive Officers for the British Service; and 6 to 174 or 1 Deputy Inspector to every 29 Executive Officers for the Indian Service.

But the fact remains that there is 1 Inspector General and 1 Secretary to 74 Executive British Medical Officers, and but 1 Inspector and 1 Secretary to 173 Indian Medical Officers.

Further, it may be noticed that whereas in the British Service, as a general rule, there are three Medical Officers to one charge, in the Indian Service it is the exception to find more than one Medical Officer attached to any particular charge.

The total gain by the new organization, to the British Medical Service in the Madras Presidency, is :—

		Rs.
1	Inspector General of Hospitals.......	2,500
2	Deputy do.	3,600
1	Staff Surgeon-Major....................	1,400
1	Secretary to Inspector General......	700*
	Total monthly gain Rs...	8,200

The total loss to the Indian Medical Service in Madras is :—

		Rs.
1	Inspector General of Hospitals......	2,500
2	Deputy do.	3,600
	Total monthly loss Rs...	6,100

And deducting the last named sum from the former, we find the increased demand on the Indian exchequer, under the new arrangement, 8,200—6,100=2,100, or an annual amount of Rupees 25,200.

As before said, we congratulate the members of the British Medical Service on their immense gain, while, at the same time, we deplore the evident fact that the Indian Medical Service is considered of such light moment that it is expected to be grateful that the higher paid appointments to which it *had* to look have been reduced by nearly one-third only of their number, viz., from 10 to 7 ; and to be oblivious of another fact (sadly remembered, though, by the majority) that it is not many years since that these higher paid appointments numbered 13, viz., 3 Members of the Medical Board and 10 Superintending Surgeons.

* With pay of Rank.

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1.—Report on a Project for the Drainage of the Town of Madras. By Captain Hector Tulloch, R. E. 1865. Gantz Brothers.

2.—A Hand-book of the Trees, Shrubs and Herbaceous Plants, growing in the Madras Agri-Horticultural Society's Gardens and Neighbourhood of Madras. By R. N. Brown. Second Edition, with a Supplement by J. J. Wood, 1866........Higginbotham, Madras.

3.—Report on Vaccination for 1865. Selected from the Records of the Madras Government. Published by Authority. 1866....................Printed by Graves, Cookson and Co.

4.—On the Curability of Certain forms of Insanity, Epilepsy, Catalepsy, and Hysteria in Females. By B. Brown, F. R. C. S. 1866 .... Hardwicke, London.

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8.—The action of Fungi in the Production of Disease. By Dr. Tilbury Fox, 1866. Reprinted from the Edinburgh Medical Journal ....Oliver & Boyd, Edinburgh.

9.—Dr. J. Moore Neligan's Practical Treatise on Diseases of the Skin. Second Edition, revised and enlarged, by Dr. Belcher, 1866......... .... Fannin & Co., Dublin.

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We have also been advised of the despatch of two parcels of Journals by the long sea route. We hope to announce their receipt in our next number.

INDEX.

Page.

Abortion, Criminal, Mr. Clementson's Case of ... 181
Administrative Medical Staff of India, Organization of ... 429
A few practical remarks and reminiscences bearing on Asiatic Cholera, by Dr. Macbeth 305
Amaurosis, Case of, depending upon a large Scrofulous tumour of the brain 404
American Medical Fees, Table of 258
American Military Hygiene 242
American Notes, 3rd Series, by Dr. King 238
Amputation, Primary and Secondary, for Gangrene of leg, by Dr. Shortt 393
Analysis of the Historical Register of the 23rd Regt. L. I., by Mr. Morgan 209
Anæsthetics in America 238,240
Aneurism of the Thoracic Aorta, Dr. Farquhar's Case ... 160
Annual Medical Report of Troops at Secunderabad, Extracts from, by Mr. Balfour 261
Artificial hip-joint 247

Balfour, Deputy Inspector General, Extracts from Annual Medical Report of Troops at Secunderabad ... 261
Bangalore, Dr. Innes on an Epidemic of Dysentery at ... 295
——— Mr. Lowe's Report on Bilious Relapsing Fever at. 101
Belladonna, Mr. Ranking's Case of poisoning by ... 401
Bidie, Professor, Valedictory Address to the Students of the Medical College 200
Boggs, Dr. Thesis on Metritis ... ... *Review* 143
Books received 434
Brodrick, Dr., Report on Fever in Western Malwa ... 229
Brown and Wood's Hand-book of Madras Trees, &c. *Review* 379
Brown, Mr. J. Baker, on the Curability of Epilepsy, &c. *Review* 369
Butcher, Mr., Essays and Reports on Surgery... *Review* 132

Cerebro-spinal Meningitis 245
Chipperfield, Mr., Case of Paralysis 404
——— Report on the Febrifuge properties of the leaves of Cinchona... 85
Chloroform versus Ether 238
——— in Photophobia 240
Cholera in Kurnool, Mr. Day on 338
——— Its Prophylaxis and Treatment, by Dr. Macbeth 305

Page.

Cholera, Thoughts on the Etiology of, by Mr. Wilkins ... 321
Circular Letter of Principal Inspector General on the Management of Civil Dispensaries 424
Civil Dispensaries, Minute and Order of Government on ... 421
Clementson, Mr., Case of Criminal Abortion 181
Cornish, Mr., On the Oxidation of Organic Impurities in Water 90

Day, Mr., Note on Prickly Pear as fodder for cattle ... 425
——— On Cholera in Kurnool 338
Delirium Tremens, and its Treatment by Ipecacuanha, Dr. Farquhar on 1
Diseases of the Eye, Dr. George Smith's Lectures on ... 51
Drury, Col. H., Hand-book of the Indian Flora. *Review.* 358
Dysentery, among the 16th Lancers at Bangalore, Dr. Innes on 295

Ellis, Hon'ble R. S., Madras Mortuary Report for 2nd Quarter, 1866 188
Enormous Vesical Calculus 257
Essays and Reports on Surgery, by Mr. Butcher *Review.* 132
Etiology of Cholera, Mr. Wilkins on 321
Extension by means of adhesive plaster and a weight ... 246

Farquhar, Dr., Case of Aneurism of the Thoracic Aorta ... 160
——— ——— Hydrophobia 165
——— ——— Open Foramen Ovale 162
——— On Delirium Tremens and its Treatment by Ipecacuanha 1
Fees, Medical, in New York, Table of 258
Fever, Bilious Relapsing, at Bangalore 101
——— in Western Malwa 229

Gangrene of the leg, the Sequela of Fever 393

Hand-book of the Indian Flora ... ...*Review.* 358
——— of the Trees, Shrubs and Herbaceous Plants growing in the neighbourhood of Madras ...*Review.* 379
Harris, Dr., Case of Ovariotomy... 169
———, Case of Stricture of the Urethra 176
Hydrophobia, Case of, by Dr. Farquhar 165
Hygiene, Military, in America 242
——— Oxidation of Organic Impurities in Water... 90
Hysteria, Epilepsy, &c. Baker Brown on the Curability of, *Review* 369

Innes, Dr., on Epidemic Dysentery among the 16th Lancers 295

Page.

Ipecacuanha Treatment of Delirium Tremens 1

King, Dr. H., American Notes, Series III 238
Kurnool, Mr. Day, on Cholera in... 338

Leaves of Cinchona, Febrifuge properties of 85
Lithotomy through the rectum 256
Lock Hospital at Secunderabad 266
Lord Napier's Minute on the Civil Dispensary at Coimbatore 421
Lowe, Mr., Report on Bilious Relapsing Fever at Bangalore 101

Macbeth, Dr., on the Prophylaxis and Treatment of Cholera 305
Madras District, Topographical Report of, (Concluded) ... 21
——— Medical College, Dr. Bidie's Valedictory Address ... 200
——————— Termination of Session 1865-66 200
——— Mortuary Report for 1st Quarter 1866 ... 182
——— 2nd ——— 188
——— 3rd ——— 409
Maunder's Treasury of Botany ... *Review* 358
Medical Administrative Staff for India, Organization of ... 429
Medical Intelligence 200,421
——— Miscellany 160,393
——— Officers, Sick furlough pay of 208
Meteorological Reports, for 2nd Quarter 1866... ... 197
——————— 3rd ——— ... 418
Metritis, Dr. Boggs, Thesis on ... ... *Review.* 143
Military Hygiene in America 242
Morgan, Mr., Analysis of the Historical Register of the 23rd Regt. L. I. 209

New Rules for the Supply of Surgical Instruments to Medical Officers 427
Nitrous Oxide as an Anæsthetic 240

Open Foramen Ovale, Dr. Farquhar's Case of... ... 162
Opium, an Antidote to Belladonna 401
Orders of the Madras Government on Civil Dispensaries ... 421
——————— on the Report on Vaccination for 1865 ... 426
——————— on the Supply of Surgical Instruments ... 427
Organization of the Administrative Medical Staff in India.. 429
Ovariotomy, Dr. Harris's Case of 169
Oxidation of Organic Impurities in Water, Mr. Cornish on.. 90

Periodicals received 208,434
Poisoning by Belladonna, Mr. Ranking's Case of ... 401

Pag

Porter, Dr., Cases of Rupture of the Spleen 4
Prickly Pear as fodder for Cattle, Mr. Day's Note on ... 4
Procidentia Uteri, Radical Cure of 2

Radical Cure of Procidentia Uteri 2
Ranking, Mr., Case of Poisoning by Belladonna ... 4
Reduction of the number of Depy. Inspectors General of the Indian Medical Service 4
Report, Meteorological, for 2nd Quarter 1866... ... 1
——— 3rd ——— 4
——— of Deaths in Madras, 1st Quarter 1866 ... 1
——— 2nd ——— ... 1
——— 3rd ——— ... 4
——— on a Project for the Drainage of Madras .. *Review.* 3
——— on Fever in Bangalore 1
——— in Western Malwa 2
——— on the Febrifuge properties of Cinchona leaves ...
——— on Vaccination in the Madras Presidency, 1865 *Review*... 3
——— Government orders on... 4
——— Topographical, of the Madras District (Concluded)...

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Page.

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Sayre, Dr., on Artificial Hip-joint 247

Secunderabad, Extracts from Mr. Balfour's Annual Report on 260

Shortt, Dr., Case of Amputation for Gangrene of the Leg... 393

——— Report on Vaccination for 1865... *Review* 376

Sick Furlough Pay of Medical Officers 208

Silver wire sutures, Advantages of... 257

Smith, Dr. George, Lectures on Diseases of the Eye ... 51

Smith, Dr. W. Arnold, Madras Mortuary Report for 1st Quarter 1866 182

——————————— 3rd 409

Solly's Surgical Experiences... ... *Review* 150

Spleen, Dr. Porter's Cases of Rupture of 403